BRAKES ON MODERN INDIAN ENGINES

See Advert, Page 2

MODERN TRANSPORT

"THE TIMES" OF THE TRANSPORT WORLD

FIRST PRODUCTION B.R. A.C. ELECTRIC LOCOMOTIVE

See Page 3

VOL. LXXXII No. 2116 [*Registered at the G.P.O. as a newspaper*] LONDON, DECEMBER 5, 1959 PRICE NINEPENCE

CURRENT TOPICS

Labour and Industry

TWO events of importance to industry occurred last week. One was the rejection by the engineering employers' federation of the unions' claim for another £1 a week but with an offer to reduce the standard working week from 44 to 42½ hours; the other the public condemnation by the T.U.C. General Council of the Electrical Trades Union for evading an investigation into charges of election malpractices and Communist interference. In its failure after a year's abortive communication to bring the union to heel the General Council has strengthened the case for legislation to ensure the proper conduct of union elections. The leaders of the E.T.U., who have challenged the T.U.C. to pay the cost of legal action, have naturally played upon the objections held by most trade unionists to outside interference. But public opinion has been roused and Communist influence may decline. The engineering employers' offer of a 42½-hr. week was rejected by the union representatives. Refusal of a wage increase is explained by stabilisation in the cost of living and by the argument that since 1954 earnings have risen about twice as much as production. On the basis of an average 47-hr. week, at present being worked, the employers' offer would cost them more than £36 million a year and be equivalent to a wage increase of between 4½ and 5 per cent, it is stated. The tendency to shorten the standard week (which will spread throughout industry generally) without any definite arrangement or understanding regarding increased productivity is dangerous. It was on this account that the shipbuilders (as recorded in our last issue) insisted that discussions should depend upon concrete evidence that the unions would co-operate in the introduction of new techniques and in avoiding restrictions on output.

Echo of B.O.C. Strike

STRONG condemnation of the actions of the unofficial strike committee which engineered the stoppage of lorry drivers of the hapless British Oxygen Company, in October, is contained in an article appearing in the Transport and General Workers Union *Record* this month. Mr. L. Kealey, secretary of the national metal and engineering group committee, does not mince his words. Had the strike leaders, he says, shown a sense of responsibility, had they accepted the self-discipline which collective action in a trade union demands, they would have been enabled to learn the facts — facts which demonstrated the utter futility of the strike. As it was, they sedulously handed out distorted versions to the strikers, he charges. Mr. Kealey then proceeds to give the facts leading up to the stoppage. It appears that 10 months elapsed between the first union branches concerned formulating a wage claim and the submission of the claim to the employers. A reply was received on October 20, three months after submission, but a year from the formulation of the claim. Mr. Kealey reasonably explains the 10-month delay in this way: "We cannot demand concessions from any management . . . consequently a strategy based on priorities and possibilities has to be followed." As it was, he says, the claim was lodged when the time seemed ripe. Some steps were apparently taken to keep the members informed of these moves, but were they adequate? This dispute once again illustrates the divided allegiance which has been allowed to develop in union branches; allegiance nominally to the duly-elected representatives, overlaid by the ready ear lent to unofficial leaders who always appear to know what is going on. Unfortunately the news they spread is, as Mr. Kealey plainly says, often deliberately distorted. He has the remedy in his own hands. Union officials will have to anticipate and supplant these false prophets, keeping their members constantly informed of the true situation, and if Mr. Kealey has a strategy, that almost must be made plain. There is another side to this—employers who enter into negotiating machinery with a union surely have the right to expect that the union will at all times see that its members respect and abide by it.

No. E3001

BY energising the first of the new 25,000-volt 50-cycle British Railways electric locomotives on Friday of last week, Lord Rusholme opened a new chapter of transport history and brought nearer the day when the London Midland Region will be electrified south of the Mersey. The new locomotive, No. E3001, which is illustrated and described on page 3 of this issue, is one of a batch under construction for what has become the Traction Division of Associated Electrical Industries at Rugby, in the former B.T.H. works. Others will appear from the A.E.I. group's Trafford Park works, formerly Metropolitan-Vickers, and whereas E3001 incorporates mechanical equipment and superstructure by Birmingham Railway Carriage and Wagon Co., Limited, the Metrovick units will have Beyer Peacock mechanical parts. Alsthom bogie design and quill drive have been used in E3001. A further batch of A.E.I. electrical equipments will be supplied to British Railways for use in locomotives to be built in B.R. works. The English Electric and General Electric groups are also building machines for this order, which was placed in 1957 and which permits a number of differences in design within the overall framework of B.R. requirements. The initial order totalled 100 locomotives. In handing over the new machine, Lord Chandos, chairman of A.E.I., thanked the engineering staff of British Railways for co-operation in the new techniques of 50-cycle work. Lord Rusholme took the opportunity to point out that although six B.R. electrifications were opening in the next two years, including Manchester—Crewe and Liverpool—Crewe, the plan to complete the extension from Crewe to London four years earlier than originally planned would cause some inconvenience, which the London Midland Region hoped would be borne with patience and goodwill by the customers, who might find consolation in the growing evidence of far better electric services being on the way.

Electric Coaching Stock Ordered

WORKSHOPS of British Railways are to build another 648 electric coaches valued at £10 million ordered by the British Transport Commission for electrification programmes in the North West, North East London and Kent. They are to be built in railway workshops at Doncaster, Eastleigh, Wolverton and York. For the electric train services to be introduced in September next between London Liverpool Street and Enfield, Chingford, Hertford East and Bishops Stortford, 232 vehicles are to be built, 76 of them at Doncaster and 156 at York. Those to be built at York will form 52 three-car train sets for the Enfield and Chingford services, and those from Doncaster will comprise 19 four-car trains for the Hertford East and Bishops Stortford lines. Also in September next electric trains are to be introduced between Manchester and Crewe; 60 coaches to form 15 four-car units are now being built at Wolverton works. A further 80 vehicles have now been ordered to form 20 four-car units; these will be built at Wolverton next year for the Liverpool—Crewe service. Work is in progress on the second phase of the Kent Coast electrification scheme, which it is hoped to complete by June, 1962, when all main lines in Kent will be electrified. This second phase will project electrification from Sevenoaks and Maidstone via Ashford to Folkestone and Dover. For these services 336 coaches are to be built by Eastleigh; 236 will form 59 four-car sets, of which 10 will include a buffet; 92 will run as 46 two-car units. The remaining eight vehicles will be self-propelled electric luggage vans with battery equipment. Apart from normal passenger services on these lines, boat trains to and from London, except for *Golden Arrow* and *Night Ferry*, will also be operated by the electric multiple-unit trains. The electric luggage vans will provide additional baggage acommodation and if they are at the front the whole train can be controlled from their driving compartment.

LEADING FEATURES IN THIS ISSUE

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British Lead in Multi-Fuel Engines

WITH a precedent already established in the development and quantity production of the high-speed lightweight diesel engine, which over the past 30 years has set standards of efficiency, reliability and durability aimed at but never quite attained by contemporary interests elsewhere, the British motor industry appears again to have achieved a major advance in the development of engines capable of operating efficiently on a wide range of fuels. The development has been carried out by a number of commercial concerns, including the Rootes Group, Leyland Motors, Rolls-Royce, Coventry Climax, C.A.V. and Weslake and Company, under contract to the erstwhile Ministry of Supply. Effort so far expended has resulted in a new range of multi-fuel engines of exceptionally high efficiency, low specific weight and bulk and freedom from mechanical complexity, designed for application in fighting vehicles, and a fund of knowledge to provide excellent multi-fuel characteristics in diesel engines of normal commercial production without sacrifice of performance when running on the lighter fuels. Of great significance militarily, because of the desirability of taking advantage of the high fuel efficiency of the diesel engine without having to rely solely on a single type of fuel that is already in short supply, the development is also of civil interest in view of the growing demands for middle-distillate fuels. The new engines are all of the opposed-piston two-stroke type having direct fuel injection, the development of which into a practicable automotive unit owes much to Rootes Group engineers, while its emergence as a superior multi-fuel engine has resulted from work undertaken in the same company and at the Fighting Vehicles Research and Development Establishment. While not always able to commend the outcome of projects in the automotive field initiated in the past by the now-defunct Ministry of Supply, its sponsorship in this case has been timely and productive of highly beneficial results. On page 15 this week we start publication of a series of abstracts recently presented at a symposium on multi-fuel diesel engines held at the F.V.R.D.E., when many of the practical results of recent work in this field were also demonstrated.

Launching the New Code

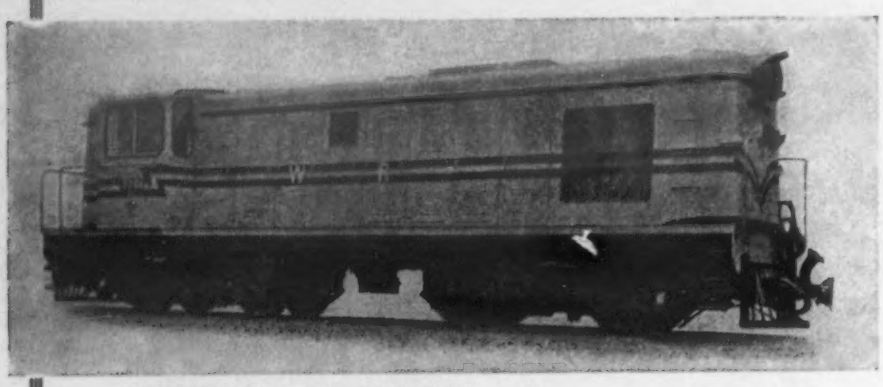
MUCH good clean fun was had by all from the new Minister of Transport downwards in launching the latest edition of the Highway Code last Monday. Ceremonial included the handing by Mr. Marples of copies of the code and signed messages to motor-cycle dispatch riders for delivery to mayors of all the London boroughs, inaugural ceremonies in many large cities and towns throughout Britain, unveiling of tableaux, posters and display material in other centres and express delivery of a dozen copies of the code, autographed by the Minister, from London to the Midlands. All types of road user took part in the Midlands delivery—a car driver in the person of Mr. George Eyles, of the Institute of Advanced Motorists, from London to Coventry by way of the new motorway, a motor-scooterist complete with police motor-cycle escort from Coventry to Birmingham, a boy cyclist also with motor-cycle escort over the last few hundred yards to the Birmingham Council House and by two pedestrian old-age pensioners up the steps of the Council House, where the package was handed over to the Lord Mayor of Birmingham. With a daily total of 800 killed and injured on our roads and casualties still rising, it is to be hoped that this massive send-off will remind all road users that there is a simple commonsense code of behaviour laid down for them. As Mr. Marples observed, strict observance of the Highway Code by the whole nation would have a remarkable effect on the accident rate and would also help to solve many traffic problems. His ballyhoo to try to focus attention on it is justifiable.

Railway Club's Diamond Jubilee

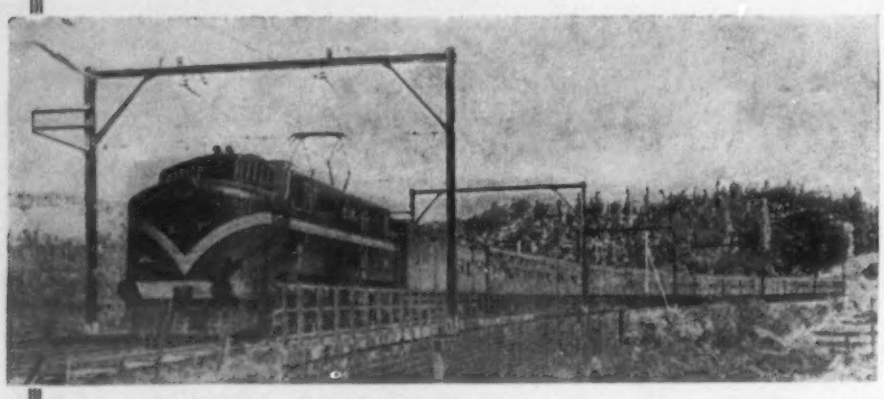
AMONG the priceless assets of this country's railways are the enthusiasm engendered by them among very large sections of the general public. One of the first organised manifestations of this movement, which must greatly ease the work of any public relations officer, was the formation of the Railway Club by a number of amateur railway enthusiasts in Birmingham in 1899. The club soon experienced the call of the Metropolis and became established in London, where it at present has premises and a library for members at 320 High Holborn. This, its diamond jubilee year, has been marked by a special series of papers and visits dealing with the period of its existence and a highlight of the celebrations was the occasion of the annual dinner held last week. The chair was taken by Mr. T. S. Lascelles, the president, who was supported by the officers and committee and a record number of members. Principal guest was Sir John Elliot; others included Mr. L. C. Johnson, archivist, B.T.C., Mr. J. H. Scholes, curator of historical relics, B.T.C., and Mr. C. J. Rider, public relations and publicity officer, Western Region. Sir John, in replying to "The Guests," proposed by Mr. D. S. M. Barrie, assistant secretary-general, B.T.C., suggested that if it was mad for accountants, clergymen, solicitors and barristers and others outside the railway service to be railway enthusiasts, at least they were delightfully mad.

WESTINGHOUSE BRAKES
ON MODERN INDIAN LOCOMOTIVES

EASTERN RAILWAY One of twelve 3120 h.p. electric locomotives built by The English Electric Company, and fitted with Westinghouse Vacuum/Air Brakes.



WESTERN RAILWAY One of twenty 625 h.p. diesel-electric locomotives built by North British Locomotive Company, and fitted with Westinghouse Vacuum/Air Brakes.



CENTRAL RAILWAY One of seven 3600 h.p. electric locomotives built by The English Electric Company with mechanical parts by Vulcan Foundry Ltd., and fitted with Westinghouse Vacuum/Air Brakes.

The brakes were designed and made in England, and supplied by:
Westinghouse Brake and Signal Co. Ltd., 82 York Way, London, N.1
Sanby & Farmer (India) Private Ltd., Calcutta Westinghouse Brake (Australasia) Pty., Ltd., Concord West, N.S.W.
Westinghouse Brake & Signal Co. S.A. (Pty.) Ltd., Johannesburg
Agents:—Bellamy & Lambie, Johannesburg

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MODERN TRANSPORT

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

We desire to call the attention of our readers to the fact that Russell Court, 3-16 Woburn Place, London, W.C.1, is our sole London address, and that no connection exists between this newspaper and any other publications bearing somewhat similar titles.

Railway Passenger Service

BECAUSE of differences in public taste and in geographical circumstances there may be many divergent solutions to any given transport problem. Optimum passenger timetables on railways, with a view to good public service and the maximising of net revenue, are thus subject to wide differences of interpretation, depending on traffic volume, public pressure for intermediate stops, the physical nature of the route and the prospects of developments in competitive media. The paper read by Mr. G. F. Fiennes last week before the Railway Students Association thus assumes considerable importance as a starting point for discussion. While modernisation plans are still nascent they can be moulded to suit traffic conditions of the future; soon the opportunity to frame the desired train service and according to its needs set out the desirable features of motive power and rolling stock will be irrevocably gone. The principal and obvious difficulty is in foretelling what the public will expect of railways—if they are still to patronise them—in the latter part of the century. It is certain that the various divisions of public transport do not really know the motives of car owners when making journeys by road for which the railway is apparently suitable and, moreover, it is probable that the railways are at a disadvantage in any estimate of car appeal because comparatively few railway officers are enthusiastic motorists; too many rely on the comforting thought that traffic congestion will eventually drive road users back to the railway.

Diverse Patterns of Journey

MORE research into the habits of the car owner, as suggested by Mr. Fiennes, might well be invaluable in showing up a need for a different pattern of public service. That service need not end on the railway, but should properly include bus and coach facilities and the use of hire cars beyond or between the railway journeys. Only with such ramifications can the railway be of use in the widely diverse criss-cross pattern of journeys made by travellers outside the great conurbations, whose needs are not covered by the canalised movements between the great cities and between them and the Metropolis. Even in those intense traffic movements the car may often beat public transport, for people do not live at Paddington and have to do business at Snow Hill; they come from a London suburb and go to somewhere in the Black Country and unless the train service is both fast and frequent over such a distance as London to Birmingham the car might easily beat it even before the motorway came to its aid. The author of last week's paper, although showing refreshing realism in respect of the potentialities of the car, allowed too little time for the average journey by public transport to a London terminus. His 45-min. allowance may become, for the suburbanite unserved by a fast outer-suburban service, as much as 100 min.; this gives the car user that much advantage, only slightly offset for starts before the morning peak hour by the necessity of crossing London. The necessity of liberal train services at commercial speeds of 75 m.p.h. is thus reinforced.

Stops

SUCH speeds do not necessarily require long non-stop runs; when electricity is the motive power they are not incompatible with a reasonable number of stops. The Chicago, North Shore and Milwaukee Railroad's Skokie Valley line 20 years ago provided 75-m.p.h. start-to-stop bookings over distances as short as 13 miles, and that with trolley-wheel current collection. On our more crowded routes there might be complications, but translation into a London Bridge—Brighton run in 41 min. deserves a passing thought. A correspondent whose letter we publish this week has been quick to defend the Southern pattern of service—commended by Mr. Fiennes—which depends on frequent trains and good connections to corollary services, rail and road, rather than very high speed and which has stood the test of commercial success on interurban routes for nearly three decades. It is again establishing massive traffic increases on the Thanet electrification inaugurated at midsummer. Whether the motorway era will eventually leave it enjoying so high a proportion of traffic to its extreme destinations may nonetheless be a matter for argument. It is already sadly the case that many cross-country journeys in the south of England, well provided with public transport though it is, are quicker by car, despite main roads little better than twisting lanes.

Air Competition

WHAT weight to attach to air competition must be another problem for the railway timetable compiler that cannot be evaded. Air transport stands still less than any other form. Helicopter progress, the further development of the Rotodyne and the Hovercraft, and even the effect of road improvements on access to airports (West Kensington to London Airport will take 25 instead of 60 min., Mr. Marples anticipates) must be allowed for. Without sacrificing comfort or safety the answer is that railway survival is dependent on speed, frequency and good connections either to branch and local railway services or to road passenger transport. It is obvious that this view has been taken by the Continental railways in establishing internal services at up to 80 m.p.h. average, as in France, and the international network of T.E.E. routes. Their problem is easier to solve because of lower train densities, but the continuous urge towards higher speed is shown by successive European timetable improvements. From May 29, 1960, the Simplon—Orient express will reduce times from London to Venice and Trieste by 3½ hr., to Belgrade by nearly 6½ hr., and to Athens by 3¾ hr. Some 3 to 3½ hr. will be lopped from Paris—Rome times; the London—Calais—Basel run will be 1¼ hr. shorter. Electric traction is playing an increasing part in these results. Slowly—all too slowly—railways are realising the public desire for fast travel and that they can provide means for satisfying it.

NEWS SUMMARY

ON November 30 Mr. Ernest Marples, Minister of Transport, put into operation a plan in a "pink" zone of London's West End, bounded by Marylebone Road, Kingsway, Piccadilly and Park Lane, to overcome Christmas traffic congestion by strict enforcement of no-parking regulations. To assist motorists 17 special car parks, mostly well outside the area, have been opened. Goods delivery is permitted up to 1 p.m., but certain additional junctions are to be kept clear. Up to the time of going to press it has every appearance of success and it may be extended to other congested city centres.

British Railways has taken delivery of the first of its new 25,000-volt 50-cycle a.c. electric locomotives. See page 3.

A Continental car-ferry centre has been opened by Southern Region of British Railways, in conjunction with French Railways, Belgian Railways and Marine and the A.A. and R.A.C., near Victoria Station to deal with cross-Channel car bookings, which run at more than 250,000 a year.

At the Transportation Club dinner on November 26 Mr. Christopher T. Brunner gave an address on the relations of the oil industry to the railways. See page 13.

The first of the Boeing 707s with Rolls-Royce Conway engines for B.O.A.C. may not be delivered as early as was expected due to delays for additional tests required by the Air Registration Board.

Following the recent proving flight to Lydda, a de Havilland Comet 4B of British European Airways was leaving London for Copenhagen, Moscow, Warsaw, Stockholm and Oslo on December 3.

The opening of the Lisbon underground, scheduled for November, has been postponed until early in 1960.

Warrington Corporation will introduce a rearranged pattern of bus services to make considerable savings of mileage on December 27.

THE NEW ELECTRIC ERA

First Production A.C. Locomotive for B.R.

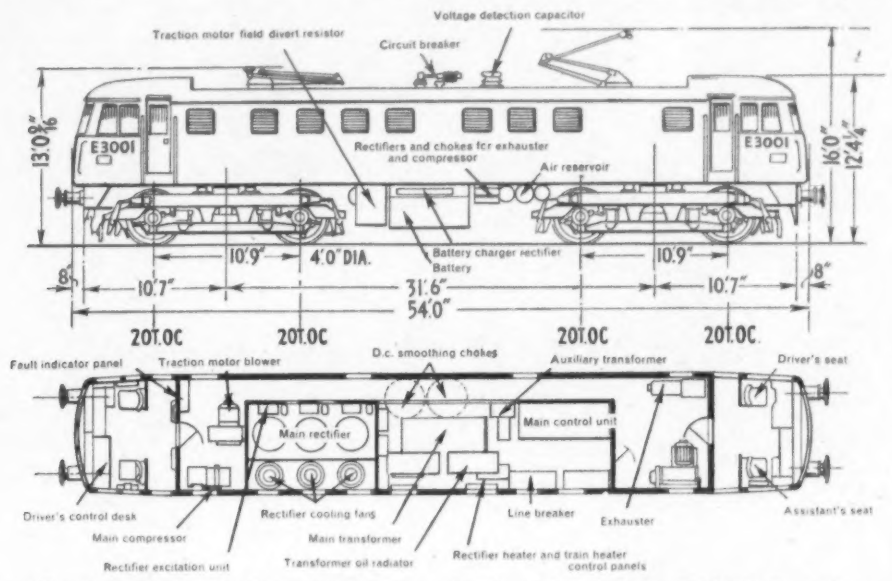
FROM A.E.I. TRACTION DIVISION

ON November 27, Lord Chandos, chairman of Associated Electrical Industries, Limited, handed over to Lord Rusholme, chairman of the London Midland Area Board of the B.T.C., in a short ceremony at Sandbach, the first of the 25,000-volt 50-cycle a.c. electric locomotives to be delivered to British Railways under the schemes associated with railway modernisation. Lord Chandos referred appreciatively to the work of Mr. S. B. Warder, chief electrical engineer, B.R., now visiting India, and to the assistance received from the engineering staff of British Railways in perfecting the new techniques for a new system of electrification. He mentioned also the co-operation with Birmingham Railway Carriage and Wagon Co., Limited, builders of the mechanical parts of the locomotives and of advice from Alsthom in adopting the Alsthom drive and bogie design.

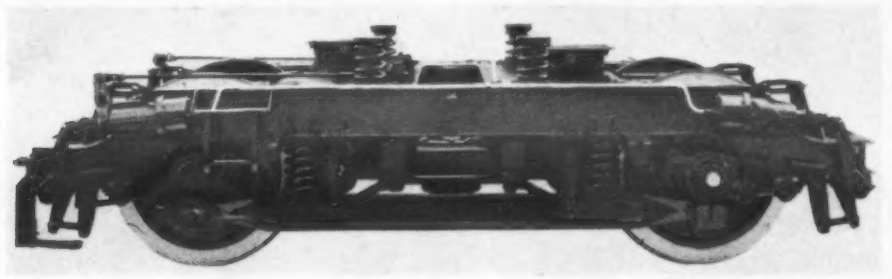
Lord Rusholme accepted a key from Lord Chandos, with which he energised the locomotive from the station platform. Use of electric power at industrial frequency straight from the grid was an important technical advance; it was a bold and imaginative step by the B.T.C. to adopt the system, with its cheaper and more quickly installed fixed equipment. In the next two years six a.c. electrification schemes would be completed—around Glasgow, to the north and east of London, and there, in Lancashire and Cheshire, where two great cities of the County Palatine, Manchester and Liverpool, would both be linked by electric services with their railway gateway to the south, at Crewe—from Manchester next September and from Liverpool in 1961. By the end of 1964 it is hoped that electric expresses will link London with Birmingham, Manchester and Liverpool.

	Type A	*Type B*
Wheel arrangement	Bo-Bo	Bo-Bo
Horsepower at 1-hr. rating of traction motors	3,680	2,680
Maximum speed—m.p.h.	100	80
Weight—tons	80	80
Brakes	Vacuum controlled	Straight air on locomotives
Maximum tractive effort at peak notching current	48,000 lb.	60,000 lb.
Tractive effort at continuous rating of motors	20,000 lb.	24,000 lb.
Speed at continuous rating of traction motors	60 m.p.h.	49 m.p.h.

The locomotive is designed primarily for operation at a line voltage of 25,000 50 cycles a.c. However, it has also to develop its full output at which E3001 is the first, geared for a top speed of 100 m.p.h. and two type B locomotives suitable for a top speed of 80 m.p.h. Principal technical particulars of the locomotives are tabulated.

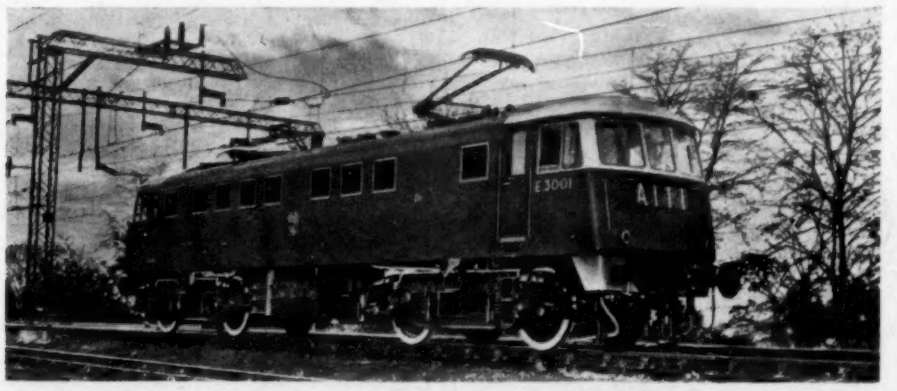


Elevation and plan drawings of Bo-Bo locomotive No. E3001, built for British Railways by A.E.I. (Rugby) and the Birmingham Railway Carriage and Wagon Co., Limited



Elevation of Alsthom bogie

Current, collected from the overhead wire by pantographs of the Stone-Faiveley AMBR pattern, is fed through a Brown Boveri air-blast circuit-breaker mounted on the roof to the main transformer. The output of the transformer is converted to direct current for the traction motors by three air-cooled six-anode pumpless steel tank mercury arc rectifiers, diametrically connected in parallel so that each tank has three anodes in each half cycle. Load-sharing reactors are provided to ensure current sharing between tanks and individual anodes. Smoothing chokes are also provided.



The 25,000-volt 50-cycle locomotive ready for service on the L.M. Crewe—Manchester electrification

Electrical Features

The order of which E3001, handed over last week, is the first, was placed with the British Thomson-Houston Co., Limited, of Rugby, now incorporated in the A.E.I. Traction Division, and is for 25 complete locomotives. The mechanical parts have been sub-contracted to the Birmingham Railway Carriage and Wagon Co., Limited, of Smethwick, Staffs. The units have been designed to the general requirements of the B.T.C. under the overall direction of Mr. S. B. Warder, chief electrical engineer, and Mr. J. S. Harrison, chief mechanical engineer, British Railways Central Staff. There will be 23 type A locomotives, of

Traction Motors

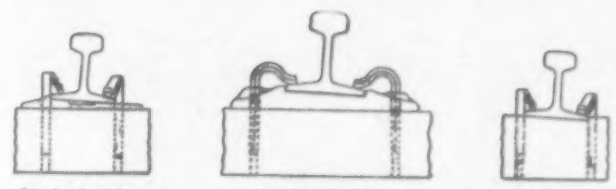
The four traction motors are connected permanently in parallel. They are six-pole series wound machines specially developed for operation on a rectified 50-cycle single-phase supply. The motors are forced ventilated and designed for long periods of operation between overhauls. This has been achieved by using, among other things, class H insulation and special lubrication arrangements. The ratings of the motors are:

Continuous rating	975V	700A	847 h.p.
1-hr. rating	975V	760A	920 h.p.
Gear ratio type A	29/76		
Gear ratio type B	28/83		

The motors are fully spring borne in the bogies,

(*Continued on page 7*)

ELASTIC RAIL SPIKES



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LORRY—BUS—COACH

Haulier with No-Traffic Base

BECAUSE it was admitted that none of the traffic carried was loaded at or in the neighbourhood of his permanent base or centre, a Leek (Staffs) haulier, Mr. R. A. Bradbury, had the renewal of his special A-licence taken to appeal by the B.T.C. The Transport Tribunal has upheld the grant; it says that if the B.T.C. submission on the meaning of section 5(3) of the Road and Rail Traffic Act, 1933 (which prescribes the traffic area in which a licence application must be made), was correct, "tramping" in the strict sense of the term would be impossible. The purpose of the subsection is to tell an applicant where he must apply.

The respondent worked exclusively under subcontract to Smith's of Eccles, Limited, which has branches at Urmston, Lancs, and elsewhere, but none in the Leek area. For the Commission, Mr. Beames contended that these circumstances were inconsistent with the requirement that the "permanent base or centre" mentioned in the subsection must be the place from which it was intended that the vehicle would normally be used. The work Bradbury was doing was "inappropriate" to the base specified. The Tribunal says: (*a*) that section 5(3) applied to "claimed tonnage" and all other applications, and Parliament cannot have intended to cut down the benefits on existing businesses in 1933 in this manner; (*b*) section 5(1)(*c*) refers to "places between which" the vehicles will normally be used, hence each journey does not have to commence at the vehicle base; (*c*) use of a vehicle from a place "for the purpose of carrying goods" (section 5(3)) does not necessarily connote the carrying of goods from that place.

Incomplete Licence Applications

FORMS not properly completed in applications for licences will in future be returned to the applicants, the South Eastern area Licensing Authority warned last week.

Standing Restricted in Manchester Buses

WITHOUT prejudice to current national negotiations on the question of standing passengers, states Manchester Corporation Transport Committee, the rules for Manchester are to be changed. On weekdays from January 3, 1960, eight standing passengers will be allowed between 5 a.m. and 9.30 a.m., none between 9.30 a.m. and 4 p.m., eight between 4 p.m. and 7 p.m., none between 7 p.m. and 10 p.m., and five after 10 p.m. On Saturdays there will be no standing between 4 a.m. and noon, but five may stand between noon and finish. On Sundays there will be no standing passengers, except between 10 p.m. and 11 p.m., when five will be allowed. Eight standing will be allowed on special football, hospital and factory bus services during off-peak periods.

R.H.A. Wins Initial Allowance Appeal

AN appeal to the Special Commissioners of Income Tax concerning the terms of the 1953 Transport Act under which purchasers of a transport unit from the British Transport Commission were entitled to apply for a special A-licence has been won by the R.H.A. The British Transport Commission and the Inland Revenue have held that some part of the price paid for the transport unit should be apportioned to that right to apply for a special A-licence. This would have the effect of limiting the amount on which initial allowances could be claimed by the purchasers in respect of vehicles so purchased. In the selected case of R. Knott and Son it has now been held that the right to apply for a special A-licence was given by statute to the purchaser of the transport unit, and did not form part of the property disposed of by the British Transport Commission.

The question of an apportionment of the price paid between the value of the vehicle and the right to apply for a special A-licence did not therefore arise. The only question of apportionment arising would be between the different items comprised in the contract of sale of the transport unit, of which items the right to apply for a special A-licence was not one. The Special Commissioners decided in favour of the purchaser and against the contention of the British Transport Commission and the Inland Revenue. This case may go to appeal.

B.O.A.C. Fleet of Two-Way Radio Vans

B.O.A.C. vans operating in the London area are now equipped with two-way v.h.f. radio. Their base is at Dilke Street, Chelsea. The heart of the system is installed in the tower at B.O.A.C. Airways Terminal, Buckingham Palace Road, Victoria, although the radio link will be remote-controlled from an office at Dilke Street. The prefix for all calls outwards is "Skyload." B.O.A.C. collects 3,000 consignments monthly within radii of about three miles of the Bank of England and Victoria.

Britain Adopts TIR Carnet

BRITAIN has now ratified the Customs Convention on the International Transport of Goods under cover of the TIR carnet. The Convention is aimed at reducing customs formalities for road vehicles carrying goods across more than one frontier. The simplified procedure comes into force on January 7, 1960, and the Ministry of Transport is the approving authority for the United Kingdom in respect of technical conditions for vehicles. Covered by the TIR carnet are the Benelux countries, France, Federal Germany, Denmark, Austria, Sweden, Switzerland and Italy.

Balancing Charges Cases Succeed

IN two balancing charges cases sponsored by the Road Haulage Association an earlier ruling was contested on the grounds that a price for nationalised goods vehicles fixed by a formula could not possibly be "open market value," and that some figure other than the compensation received for the vehicles must be arrived at. The Special Commissioners of Income Tax, upholding the views of the Association, have now held that compensation for vehicles received from the British Transport Commission under the 1947 Transport Act was not to be regarded as "open market value." The Special Commissioners determined this value by reference to an independent valuation having regard to the market conditions existing at that time, and arrived at amounts totalling in one case the equivalent of just under 25 per cent of the aggregate compensation received for the vehicles, and in the other to just over 50 per cent of the compensation for the vehicles. This case may, however, go to the High Court.

From Platforms to Tankers

CONVERSION of special A-licensed platform vehicles into tippers, tankers, or special type units, was common practice throughout the country, alleged Mr. J. M. MacInnes, a former sales manager of Comberhill Motors, Limited, Wakefield, when he gave evidence at the continued Leeds inquiry into an application by F. Chappell, Limited, Batley, to put on A-licence five tankers originally authorised on special A-licences as platform vehicles. Mr. McInnes said that in his experience so long as a new vehicle was specified on the special A-licence at its original weight, it could then be altered in any way so long as it was reweighed, the additional tax paid and the licensing authority informed. He also gave a personal service in the making out of assignment and substitution forms for customers' signature, and the provision of copy letters for notifying the licensing authority. He had experience of similar conversions in the Metropolitan, Scottish, Northern, and Western traffic areas. The inquiry was again adjourned until a date to be fixed in January.

Christmas Season Unloading Ban

DETAILS have been given by the London offices of the R.H.A. and the T.R.T.A. of the ban on loading and unloading between 1 p.m. and 6.30 p.m. in certain stretches of road in the West End of London imposed by the Minister of Transport during December to forestall the Christmas shopping congestion. The ban is being imposed on selected major intersections and short stretches of one or two major roads. About 12 sites in all are affected and include such spots as Oxford Circus, Piccadilly Circus, St. Giles Circus, Tottenham Court Road—Euston Road junction, etc. In addition vehicles will be prevented from stopping to load and unload within 100 ft. of traffic lights in all the major roads throughout the area.

Members of the Oxford Street, Regent Street and Bond Street Association have made special arrangements to receive goods from as early as 7 a.m. onwards in some cases, while the special Christmas period ban on unloading is in force in the West End. The ban applies until not later than January 16, 1960. The T.R.T.A. can supply a list of these traders to members, also a map showing restrictions in detail.

Last Over-Weight Cases?

WHAT are believed to be the last of the current "extra weight" cases have been heard before the Northern area Licensing Authority, Mr. J. A. T. Hanlon; at the conclusion the licences of three hauliers, Smith and Dixon of Sunderland, N. Elliott of Haltwhistle, Northumberland, and the Trustees of C. T. Codling of Birtley, Co. Durham, were suspended for periods of one or two months. All concerned vehicles, purchased from K. and B. Motors (Newcastle), Limited, which were subsequently discovered to be operating at unladen weights heavier than declared upon the licence application forms. In the Smith and Dixon case evidence was heard of a weight ticket issued on October 4, 1957, for one of the vehicles in question, which had been in the possession of Smith and Dixon from September 14. Mr. E. Waters, of K. and B. Motors, said: "These are the acts of a completely irresponsible person."

In the case of Elliott, Mr. Waters, asked by the licensing authority why K. and B. had weighed the vehicles twice within a comparatively short space of time, replied that while he knew of the weighing on the first occasion, the second was beyond him. Concerning the case of Codling, counsel alleged that Mr. Waters had told the operator that he could operate a heavier vehicle under the same licence without committing an offence, provided he redeclared the weight to the taxation office. Questioned about this, Mr. Waters said that he firmly believed, at that time, that there was no law being broken by doing what he did.

Weight Reducing Described

METHODS by which unladen weights of heavy vehicles could be pared were mentioned in the Northern area traffic court last week when McPhees (Newcastle), Limited, was alleged to have operated five special A-vehicles at unladen weights different than those specified in the licence. During the inquiry it was found that three Guy Invincible vehicles were actually lighter in completed form than when delivered, as cabs and chassis by the manufacturer, to K. and B. Motors (Newcastle), Limited. At a previous hearing evidence was given on behalf of K. and B. that weight could be cut by stripping vehicles of certain accessories and fitting smaller wheels and tyres. Mr. Samuel Gibbon said that evidence had been given that manufacturers' calculated weights could vary as much as 5 cwt. On this basis the weight variations to be accounted for were approximately 1 ton 84 lb.; 1 ton 6 cwt. 1 lb.; and 16 cwt. 99 lb. respectively.

There was no doubt that the fitting of Michelin X tyres saved weight. There was an added saving by the use of lighter wheels, omission of spare wheel and carrier, change of batteries and removal of spring leaves. This easily accounted for the reductions in two vehicles, but the third was more difficult. When this was first weighed on July 17, 1957, efforts to reduce it to 5 tons 6 cwt. were not successful; on September 6 that figure had been achieved by further "stripping." The Northern area Licensing Authority, Mr. J. A. T. Hanlon, reserved decision pending inquiries to Guy Motors, Limited, concerning discrepancies in invoice dates.

Bus and Coach Developments

United Counties Omnibus Co., Limited, proposes a limited stop service of six journeys a day between Luton and Bedford. Minimum fare would be 1s.

P. G. Webb, East Chaldon, Dorchester, applies for the Saturday cinema service from Winfrith to Weymouth operated by Bere Regis and District Motor Services.

Nottingham Corporation proposes a weekday service between Broad Marsh and General Hospital via Canal Street, Huntingdon Street, Parliament Street and Park Row.

A. and M. Welburn, Snaith, applies for the Newland—Selby service of E. M. Lunn.

On November 25 London Transport introduced a new Monday-Friday Central area bus route 203A between Twickenham Station and Ashford Station, via Clare Road in Stanwell and thence via Town Lane, Stanwell Road and Woodthorpe Road.

The NEW
Firestone
SUPER MILEAGE LUG

THE DUAL-PURPOSE REAR-WHEEL TRACTION TYRE with all the features you're demanding

POWER BITE TRACTION
Be it on main roads, by-roads, or no roads the Super Mileage Lug tyre's cross grooves, heavy shoulder lugs and circumferential ribbing will combine to give maximum bite and traction and long safe wear. The dual-purpose Super Mileage Lug helps reduce mechanical maintenance too. Many so-called dual-purpose tyres slip and spin causing undue strain on engines and transmissions. But with the POWER BITE TRACTION of the Super Mileage Lug, this profit-draining problem is practically eliminated.

MORE SKID DEPTH
Deeper non-skid pattern than in ordinary highway tyres gives thousands of miles of sure-footed highway hauling.

SUPER STRENGTH BODY
Super Gum-Dipped, Tension-Dried cords make a really strong, durable body which gives big dividends in tyre mileage and vehicle efficiency.

DRIVE SAFELY

OUTPULLS AND OUTLASTS any tyre of its kind.
Specially designed for on-and-off-the-road service where a large part of the work is off-the-road and particularly severe.

EXPERIENCE COUNTS 45 Factories throughout the world. Firestone total sales exceed £1,000,000 per day.

TRANSPORT AND THE WORLD BANK

I—The Machinery of Loans and Surveys

By Professor E. R. HONDELINK, M.I.C.E., M.Inst.T.

PLANNING of postwar rehabilitation for the devastated countries began in London in 1941 under the Allied Relief Bureau sponsored by the British Government. The directives for the planning were pooling of resources, joint efforts in preparations and common action in the reconstruction. This work ended in the creation of international organisations under charters for a defined period to cover the transition years of rehabilitation. U.N.R.R.A. was perhaps the best known of these; E.C.I.T.O. was created to restore the European continental transport system; and the European Coal Organisation and others for specific sectors were among these provisional organisations.

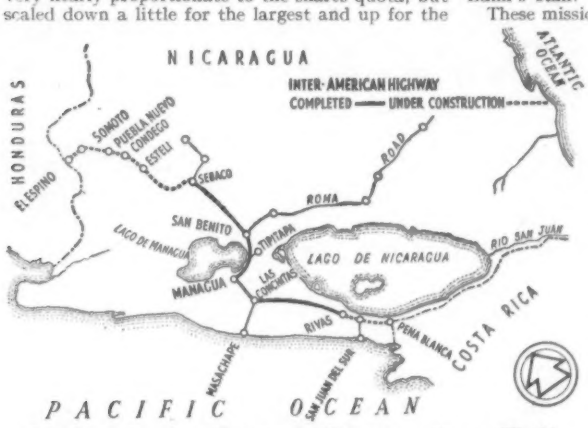
As this wartime planning proceeded, it became evident that something more than reconstruction would be needed. A wider area of the world and a longer term of future developments would require a joint approach by permanent association. Gradually organisations, now known as specialised agencies, were brought to life in close relation with the United Nations Organisation, among them the World Health Organisation, the Food and Agriculture Organisation, and also the World Bank.

Professor E. R. Hondelink

Established in 1944

The International Bank for Reconstruction and Development was established in July, 1944, at Bretton Woods, an estate in Washington, D.C. Washington was chosen as its seat and operations began there in June, 1946. Member governments then numbered 38; today there are 68 from all continents. Notable exceptions still are New Zealand as a lone Commonwealth government, Switzerland, the U.S.S.R. and its European associates, and Communist China. As the name suggests, the Bank assists in reconstruction and development projects. The first are to all practical purposes completed and development assistance is now steadily increasing. The principal means of assistance is by loans from the Bank's own capital and from funds which the Bank, with the powerful backing of the member governments, is able to secure in the world's money markets.

The Bank's authorised capital is U.S. $10 million, subscribed by member governments under a quota system laid down in the charter. The voting power, very nearly proportionate to the shares quota, but scaled down a little for the largest and up for the lowest shareholding governments, is highest for the U.S.A. at 28.43 per cent, followed by the U.K. with 11.77 per cent, Formosa China with 5.55 per cent, France with 4.89 per cent, India with 3.78 per cent—the five permanent members on the board—down to Iceland with .23 per cent and Panama with .22 per cent.



The Inter-American highway in Nicaragua, where a World Bank economic survey mission made investigations

Loans Distribution

The charter allows 20 per cent of the Bank's capital to be used for loans, but the bulk of the loan funds are found outside. Since operations began a total of $4,551 million had been distributed in loans up to October 31, 1959. They were used as follows :

	$	per cent
Reconstruction	497 million	(12)
Transport and communications	1,355 ,,	(30)
Electric power	1,460 ,,	(30)
Agriculture	316 ,,	(7)
Industry	718 ,,	(16)
General developments	205 ,,	(5)

The transport loan projects were: $129 million on ports, $12 million on shipping, $764 million on railways, $325 million on roads, $30 million on waterways, $57 million on air transport, $14 million on pipelines and $24 million on telecommunications. These projects were spread over the world's continents as follows: Europe $69 million, Asia $507 million, Australasia $132 million, Africa $334 million and Latin America $313 million. The most important borrowers have been:

Port loans: Burma, Ecuador, India ($43 million), Pakistan, Turkey.
Shipping loans: Netherlands ($12 million).
Inland water transport: Belgium ($30 million).
Railways: Brazil, Colombia, India ($219 million), Mexico ($61 million), Pakistan ($58 million), South Africa ($61 million), Sudan, Rhodesia, East Africa and Nigeria.
Roads: Belgian Congo, Colombia, Ecuador, El Salvador, Ethiopia, Guatemala and Persia ($72 million).
Air: Australia and India.
Pipelines: Pakistan.
Telecommunications: Ethiopia and Iceland.

Loans Procedure

The request for a loan in aid of a specific development project must come from a member government. The Bank will require proof that, expressed in its simplest terms, the money will be well spent. The project must be productive and earnings must cover all operating costs including interest and repayments, depreciation and reserves. The administrative, technical and economical aspects must be sound. The plan must benefit its own sector and the economy of the country as a whole. Normally the loan will be for the part of the cost of a project in foreign currencies and the government will have to show that resources are available to carry out the part which must be paid in local money. The Bank staff at head office will study all aspects of the loan project.

A mission which may consist of a single member or a team of Bank experts aided by outside specialists will examine the project and its prospects in the country. An extensive report will be submitted to the management of the Bank and after approval by the board, the loan agreement will be negotiated in Washington and finally signed by Bank and government representatives. The entire procedure may take any time up to two years or so. The loans are usually granted for periods up to 25 years; interest has varied between 3 per cent and 6 per cent and repayments begin two to four years from the loan agreement date. Technical conditions normally include that contracts for works and supplies must be open to international tenders, and consulting engineers of international repute must be employed unless the government has qualified engineers in its own service. From time to time the Bank will send a staff member to report progress, but beyond this it will not normally intervene in the carrying out of the project.

Loan projects are by no means the only concern of the Bank in development. An important department of technical assistance and liaison serves member governments who ask for advice on specific development plans. The department's main activity lies in the organisation of general economic survey missions, again at the request of a government, to examine the country's present and future economy and to advise on a co-ordinated development and investment programme. Such a mission consists mostly of outside specialists, averaging about 12 in number, with perhaps one or two economist members of the Bank's staff.

These missions take the best part of a year, first one or two weeks' preparatory work at head office, then about three months in investigations in the country, followed by several months of discussions and drafting in the compilation of the report which, after submission to the government concerned, is published simultaneously in the country's capital, in Washington, London and one or two other centres. The first mission was to Colombia in 1949. Since then there have been 19 more, to Turkey, Guatemala, Cuba, Surinam, Iraq, Ceylon, Jamaica, Mexico, Nicaragua, British Guiana, Nigeria, Syria, Malaya and Singapore, Jordan, Somaliland, Thailand, Libya, Tanganyika and Venezuela. The three last-named missions are still in progress.

Affiliated Institutions

Under the wings of the World Bank, the International Finance Corporation is operating for the purpose of promoting the growth of private investment and enterprise in the economic development of member government's countries. Its activities have mainly been in industrial expansion.

The World Bank's 1959 annual general meeting, held in September, decided to create another subsidiary which is to assist in the financing of those parts of development projects which demand local currency payments, parallel to the Bank's assistance with foreign currencies. The new administration will be a separate legal entity with its own funds. Operations and staff will be completely integrated and the Bank's loan procedures as described above will be applied.

★

ELECTRIC TRACTION STUDY COURSE

For British Railways Engineers

A STUDY course on railway electrification protective gear was held at the Trafford Park works of A.E.I., from October 13-16 and repeated from October 20 to 23. Arranged in conjunction with British Railways, it was attended by over 50 members of the technical staffs of the Eastern, London Midland, and Scottish regions of British Railways. The course included a series of 10 lectures given by a team of Metrovick specialist engineers. Lectures covered the theory, construction, application, commissioning and maintenance of Metrovick automatic circuit protective gear now being used extensively in connection with the a.c. electrification of British Railways. There were also practical demonstrations of relay operation, calibration, testing and so on, and the visitors themselves had the opportunity of carrying out practical tests under simulated site conditions.

Many items of equipment were available for inspection and a visit to a railway substation, arranged in conjunction with the London Midland Region, permitted the examination of equipment already in service.

'Keeping up with the Joneses'

The well-known haulage firm of E. H. Jones Ltd., Greenwich, say that one of their big 8-wheeler tankers has so far run 250,000 miles without any major repair. (*You've guessed right . . . it's a Leyland "Octopus"!*)

Of course, what E. H. Jones Ltd. doesn't know about looking after the welfare of their large road fleet just isn't worth knowing, but they tell us that, given normal routine servicing and a good driver, any Leyland will run more or less troublefree for years on end.

E. H. Jones ought to know! They've concentrated on Leylands of varying capacities since World War No. 1 and *every year they send us repeat orders.* We don't ask for a better testimonial to our trucks.

Vehicles operating at top-mark reliability and economy are a "must" in a big haulage concern like Jones . . . and Leylands form the basis of their fleet. Is there any moral in this little story? Well, perhaps it is that you can depend upon carefree transport if you keep your ideas in line with the Joneses.

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FOR TROUBLE-FREE TRANSPORT

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HOOTERS · HORNS · SIRENS
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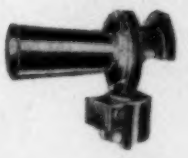
Available in a wide range of motor-driven or hand-operated models, these Klaxon hooters, sirens and alarms meet all industrial and marine requirements by providing dependable and effective warning signals under all conditions. Obtainable in ironclad, watertight, and flameproof types, with a variety of loud and distinctive continuous, intermittent or wailing notes, these alarms are recommended for use in factories, large works, warehouses, docks, ports, and for all warning purposes on land and sea. Klaxon are also makers of a wide selection of fractional horse-power motors, and geared units for an almost limitless variety of uses.

IN MINES

Ideally suitable for use in mines is this Klaxon H.F.8 flameproof, high frequency vibratory buzzer, emitting a loud, clear note over 250 yards in still air.

IN FACTORIES

This Klaxon A.1 hooter is weather-proof, motor-driven, and with a sound range of half a mile, is widely used for staff location and general signalling.



AT SEA

The Klaxon H.F.8 is a high frequency vibratory buzzer, weather-proof, and with a sound range of 250 yards in still air.

A Sound Investment in Safety

Details of full range on request:
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LONDON SALES OFFICE: 76 JERMYN STREET, ST. JAMES'S, S.W.1. Tel: WHI 0411 (PBX) *One of the Windsor Group of Companies*
B.1

DATE: October 26th, 1959
TIME: About 11 a.m.
SITE: Dunstable cutting on A5 trunk road
CAMERA: Leica with 13·5 cm. telephoto lens
TRUCKS: 6 out of 8 BEDFORDS
YOU MAY CROSS
CHEETHAM'S
HENRY KINGHAM & SONS
PNK 570

You see them everywhere

Here's a typical stretch of British trunk road. In fact, it's a part of A5, not far from Dunstable, on an ordinary day in an ordinary working week – and the photographer took the picture without any posing or special arrangements.

Now take a closer look. *Out of eight commercial vehicles in view, six are Bedfords!* This Bedford-predominance also is typical. Check it for yourself as you drive about. Bedfords ... Bedfords ... you see them everywhere!

Look who's using them, too. The haulage contractors, the big-load long-distance operators–people in a strongly competitive business who need to watch every pound of running and maintenance cost—people who give trucks a gruelling life and know how to choose the ones that can take it. These are the people who prefer Bedfords.

There's another thing. Many of the Bedfords you see on the road today have been pounding the tarmac for years and years!...That's one more good reason for Bedfords' clear leadership; they not only give dependable, stalwart, service, they give it for a long long time. There's nothing to touch Bedfords for all round value. No wonder *you see them* everywhere!

Vauxhall Motors Limited · Luton · Bedfordshire

CAR FERRY CENTRE

Southern Region Enterprise

ON November 30 Sir Philip Warter, chairman of the Southern Area Board, opened a Continental car ferry centre which from that day is handling all booking arrangements for motorists using cross-Channel ships. Situated at 52 Grosvenor Gardens, London, S.W.1, opposite Victoria Station, it is planned to deal with most inquiries by telephone (Sloane 3440) so as to cut out delays involved in dealing with the correspondence.

The centre handles bookings for motorists and their cars on all the railway shipping routes across the Channel, and for the car-sleeper trains from Boulogne and Ostend. It has been set up by British Railways jointly with French Railways, Belgian Railways and Marine, and the A.A. and R.A.C. Staff from all these organisations will be on regular duty in the centre. As well as the 17 telephone lines for public inquiries they will have a network of private lines and five teleprinter and telex machines so as to deal with inquiries speedily whether by telephone or by personal call.

Inquiries are passed at once to the reservation rooms where allocations of shipping space are recorded by use of cards, with an overall chart to show at a glance when services are full. The recording equipment is specially designed for the job and provides for rapid and foolproof service. Inquirers are able to make their car reservations immediately on the phone and receive forms within a day or so to complete their bookings. The centre is staffed to handle telephone inquiries from 7.30 a.m. to 9 p.m. and is open to callers from 8.30 a.m. to 8 p.m., Mondays to Saturdays inclusive. On Sunday it handles both telephone inquiries and callers between the hours of 9 a.m. and 5 p.m.

Those who call at the centre will be able to wait in comfort if the railway and motoring organisations counter staff—10 altogether—are busy. A striking feature of the décor is an original Cuneo oil painting of the car ferry terminal at Boulogne: Terence Cuneo was slung in a cradle of the crane which towers above the port to make his sketches. At the other end of the room is an electric clock and calendar, showing time and date. This is an Italian invention handled here by General Signal and Time Systems, Limited.

Routes booked from the Continental car ferry centre are:

Dover—Boulogne Dover—Calais Dover—Dunkerque	French and British Railways drive-on, drive-off car ferries
Dover—Ostend	Belgian Marine drive-on, drive-off car ferries
Newhaven—Dieppe	French or British Railways ships
Southampton—St. Malo Southampton—Havre	British Railways ships
Car sleeper trains	Boulogne—Lyon, Ostend—Munich, Paris—Avignon, Ostend—Milan

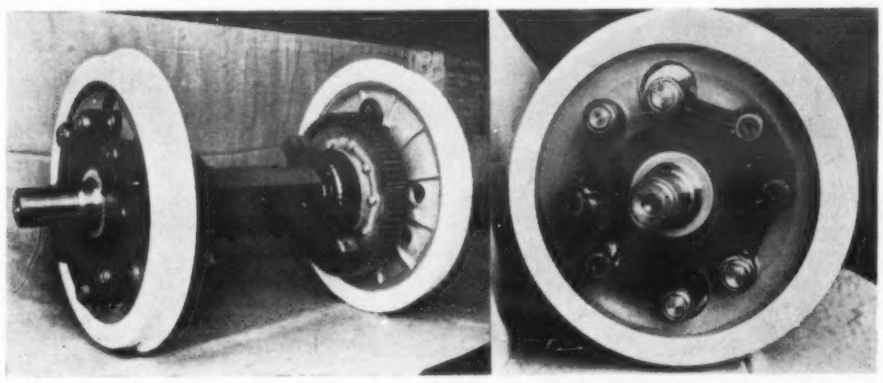
Before the war there was one Southern Railway car carrier with a capacity of 24 cars operating between Dover and Calais, as well as the ordinary passenger steamers which carry cars. In 1948 when British Railways introduced the first drive-on, drive-off, car ferry the total of motorists who took their cars across the Channel was under 42,000; 10 years later the figure was more than 200,000. So far this year some 247,000 motorists have taken their cars across on the Anglo-French routes and by the Belgian Marine ferries between Dover and Ostend.

A.C. Electric Locomotive

(*Continued from page 3*)

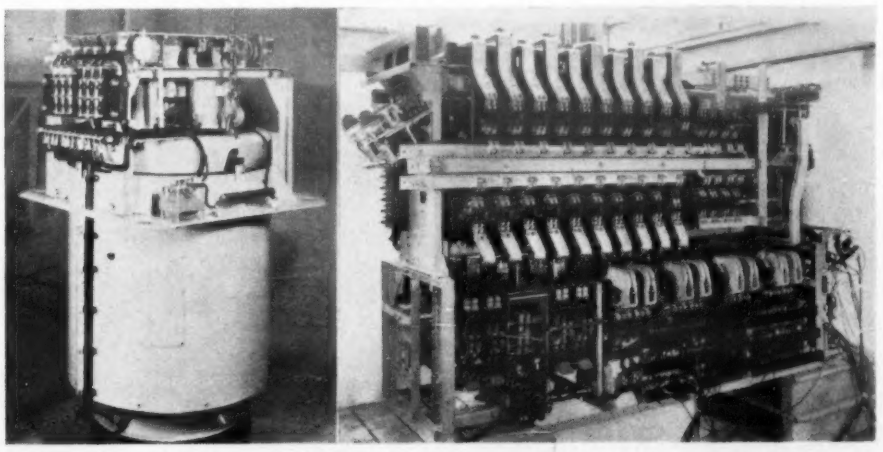
the drive being transmitted to the road wheels by a quill drive developed from the Alsthom pattern.

A camshaft control unit, actuated by the driver's master controller, provides 37 accelerating notches and two field weakening notches. Voltage control is by on-load tap-changing on the low-voltage side of the transformer winding and the output is fed to the rectifiers through two high-speed circuit breakers, thus rendering anode fuses unnecessary. Besides giving protection against backfires these breakers are also used as contactors during ordinary locomotive operation so that no individual motor contactors are provided.



Wheels and axle of E3001 and, right, detail of Alsthom drive

Two traction motor blowers, three rectifier cooling fans, two transformer oil-cooling radiator fans and a transformer oil-circulating pump are driven by a.c. single-phase capacitor start-and-run motors. Two exhausters and one compressor are driven by d.c. motors. One exhauster is battery fed; the other exhauster and the compressor are fed from the a.c. supply through germanium rectifiers.



Six-anode air-cooled mercury arc rectifier for E3001, and (right) rear of main control panel

PRINCIPAL SUB-CONTRACTORS

Electrical parts	
Transformer oil coolers	Serck
Transformer fans, rectifier fans, traction motor blowers	Aerex
Battery	Nife Batteries
Capacitors	B.I.C.C. T.C.C.
Train heating jumpers	G.E.C.
Auxiliary compressor	Clayton Dewandre
Cable	Siemens Edison Swan
Mechanical parts	
Main sub-contractor	Birmingham Railway Carriage and Wagon
Brakes, including compressor and exhausters	Westinghouse Brake and Signal
Wheels and axles	Owen and Dyson
Quill drive links	Silentbloc
Axleboxes	Skefko
Bogie centre pivot rubbers	Empire Rubber

The battery is floating continuously on a battery charger of the magnestat type which also incorporates a germanium rectifier.

Mechanical Features

The locomotive is of the double-ended type and the driving compartments at each end are connected by a corridor. Behind each driving compartment is a space in which are housed the compressor, exhausters and traction motor blowers and other equipment. The central compartment, to which access is obtained by means of an interlocked door at No. 2 end, houses the control gear, transformer and rectifiers. The interlocking allows access to the compartment only when the pantographs are lowered and the high-voltage equipment is earthed.

The complete body of the locomotive is designed as a weight-carrying structure and consists of a fabricated underframe with side members and centre sills of rolled-steel channel section. Between the bolsters, the sideframes, which are riveted to the underframe, are of braced frame construction with deep section cantrails, jointed at intervals by transverse members which also carry the pantograph feet. This provides a structure combining lightness with high resistance to buffing shocks and eccentric loading. The transverse members, which also carry the roof traps, are removable so that the body of the locomotive can be completely opened at the top between the cab bulkheads if required for removal of equipment.

The cabs at either end are in accordance with the size and layout decided upon by British Railways, as the standard for this type of a.c. locomotive, and give unusually spacious and comfortable accommodation for the crew. In order to achieve light weight the maximum use has been made of glass-fibre construction for such items as cab roofs, doors, bulkheads, air ducts and even the transformer oil-conservator tank.

Bogies

The bogies are of special interest as the suspension and the flexible drive from the frame-mounted motors utilise the well-known and proved Alsthom principles incorporating rubber bearings and pivots. The bogie frame is fabricated from Cor-ten steel and the design is such that the welding between side frames and cross members is carried out away from the points of maximum stress. The traction motors with their gears and quill shafts are carried on three-point pre-loaded rubber mountings in the bogie frames and are

(*Continued on page 13*)

HOFFMANN BALL & ROLLER BEARINGS

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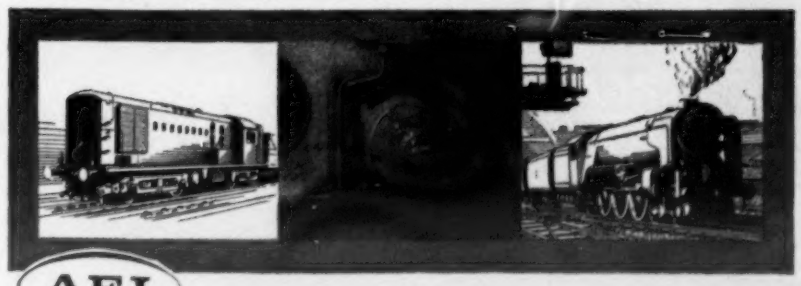

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But new Shell Anti-Freeze is absolutely safe in any British winter. What's more, Shell Anti-Freeze is also anti-corrosive. Above all, it saves you wasting the expensive time of your drivers on a cold and disagreeable job. *THINK OF THE WEATHER*

THINK OF YOUR FLEET THINK OF NEW SHELL ANTI-FREEZE

YOU CAN BE SURE OF SHELL

ROAD VEHICLE INDUSTRY

Wheel Factory in India

ESTABLISHMENT of the first rim and wheel factory in India as a joint venture of the Dunlop organisation and T. V. Sundram Iyengar and Sons, Limited, is announced by Dunlop Rubber Co., Limited. A new company, Wheels India, Limited, is to be formed, the capital of which will be subscribed by the two companies. The Dunlop contribution will be in the form of plant from the United Kingdom and technical aid will be given by the Dunlop Rim and Wheel Co., Limited, Coventry. The factory will be situated near Madras and will have an initial capacity of over 200,000 commercial vehicle wheels a year. The Government of India has approved the project in principle and its agreement to the final details is expected shortly.

Quarter-Million Land-Rovers

LAST week at the Solihull factory of the Rover Co., Limited, the 250,000th Land-Rover came off the production line; a station wagon, it is destined for the North American market, where the Rover Company last year formed a subsidiary company. Of the quarter-million Land-Rovers produced, 183,266 have gone to 157 export markets, representing a percentage of 74 per cent and earning over £87 million.

Vauxhall Motors First-Aid Extension

PROUD of its better-than-average safety record, Vauxhall Motors, Limited, is to extend its complement of trained first-aiders by giving apprentices a working knowledge of elementary first-aid when they leave the apprentice workshop for training in the factory areas and offices. During their last term in the workshop, apprentices will have 12 weekly lessons under Vauxhall St. John Ambulance Brigade corps superintendent, providing 120 trainees a year. Apprentice instructors will also be given first-aid training.

Improved Commer Van

SIX new features for the 1960 Commer Express delivery van announced by Commer Cars, Limited, include a more powerful engine, now giving 52.5 b.h.p. at 4,600 r.p.m. and a torque of 75 lb./ft. at 2,000 to 2,200 r.p.m. In addition, the engine is fitted with a Zenith 30 V.I.G. economy carburetter and with new inlet and exhaust manifolds to give improved breathing and volumetric efficiency. A new A.C. dry-type air cleaner is also specified. Other changes include a close-ratio gearbox and modification of the steering-column gearchange, so that first and second gear positions are in the upper plane of lever movement. Price of the van remains unaltered.

Battery Fluorescent Lighting

FLUORESCENT lighting has attractions for public service vehicle use and several applications have been made using vibrators or rotary converters to change the low d.c. voltage of the vehicle system to the higher a.c. voltages required for fluorescent lamps. Advantages over earlier systems are claimed by Philips Electrical, Limited, for a new type of converter for this purpose, which employs two transistors connected in push-pull. Advantages include small bulk and weight, handiness and reliability through the absence of moving parts. Maximum load at present of the Philips transistorised ballast is one 40w. 4-ft. lamp or two 20w. 2-ft. lamps.

Lucas PL700 Light Unit

OWNERS of vehicles fitted with standard Lucas F700 and P700 light units can now take advantage of the latest developments in vehicle lighting to be placed on the market by fitting a new Lucas unit designated PL700. A result of recent research into the problems of increasing visibility without increasing dazzle, it is similar in appearance to and interchangeable with the P700; it gives a longer main beam with greater intensity and in the dipped position, the asymmetrical meeting beam gives increased illumination farther along the kerb. The bulb to suit the PL700 is also of new design and utilises the Unified European cap with three contact blades.

Indian Visitors at Chrysler Factory

VISITING Britain during a world tour to study road transport productivity methods, an Indian road transport productivity team saw the fast-rising production and assembly of Dodge, De Soto and Fargo commercial vehicles and Simca cars at the Kew factory of Chrysler Motors, Limited, and Dodge Brothers (Britain), Limited, last month. During their visit to the Surrey factory, the 12-man team—representing a cross-section of India's road transport industry—watched the production of vehicles and components destined for export. The party, led by Shri. D. S. Rathor, Transport Commissioner of the State of Uttar Pradesh, was shown over the works by Mr. Wendell S. Clough, managing director of the Kew companies. From Britain the Indian delegation went to the United States.

Increased B.M.C. Club Benefits

GREATLY increased benefits under the free Personal Accident Policy have recently been announced for all members of the B.M.C. Drivers' Club. Payment in the event of death during the first five years of membership has been raised from £150 to £200. Thereafter £20 is added for each year of continuous membership up to a maximum of £300. The payment of £150 in the event of loss of an eye or limb continues. Should a member suffer any permanent disability as defined in the policy to a degree of 25 per cent or more he will receive a payment of £100 while additionally, and dependent upon any of the foregoing eventualities, payments of £30 will be made in respect of every child of the member who is under the age of 16 years. The B.M.C. Drivers' Club is now over 86,000 strong and offers free membership to any driver of a B.M.C. commercial vehicle or Nuffield tractor. In the past 3½ years more than £10,000 has been paid out under the free insurance scheme.

METRO-CAMMELL

532 TUBE CARS FOR PICCADILLY LINE

LONDON TRANSPORT

PRODUCTION IS IN FULL SWING and the first trains are now complete

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BUILDERS OF ROLLING STOCK FOR THE RAILWAYS OF THE WORLD

MOTORWAY COACH OPERATION

Suitability of Standard Reliance

A.E.C.—NORTH WESTERN TRIALS

MUCH has been heard in recent weeks of vehicles specially developed for motorway operation, but for some years to come, until the system of new motor roads is greatly extended and the use of vehicles designed exclusively for high-speed trunk services becomes economic, most operators will be more interested in the feasibility of running standard vehicles regularly over M1 and of the likely effects on existing schedules. Some interesting trials along these lines have recently been undertaken by the North Western Road Car Co., Limited, in collaboration with A.E.C., Limited, with the result that North Western has applied to adjust the route of its regular Manchester—London express service to include the London—Birmingham Motorway.

The company is to use its existing standard A.E.C. Reliance coaches, with modification only of rear-axle ratio and maximum governed engine speed and incidental adjustment of the fuel-injection equipment. The modifications are fully approved by the chassis manufacturer and, in fact, the A.E.C. service department is now in a position to quote for either carrying out the modifications or for the supply of the necessary materials.

A tumbler of water and the speedometer reading, which a check showed to be 1 m.p.h. slow at 60 m.p.h., provide evidence of the smoothness of the Reliance at over 60 m.p.h.

Performance

In modified form, governed speed of the standard Reliance 470 cu. in. underfloor diesel engine is increased from 2,000 to 2,200 r.p.m., when it is also necessary to fit a crankshaft vibration damper, though this item is in fact already fitted on some 2,000-r.p.m. engines in air-braked chassis. On some older engines different valve springs might also be required for satisfactory operation at 2,200 r.p.m. The existing 4.7 to 1 rear axle is changed for one having a ratio of 4.08 to 1 and this new unit is now added to the standard options offered in the Reliance chassis.

With the standard A.E.C. five-speed gearbox and 9.00-20 tyres, the modified vehicle has maximum speeds in fourth and fifth gears at governed engine speed of 39.5 and 61.6 m.p.h. respectively, compared with 31.2 and 48.8 m.p.h. in unmodified form. The higher axle ratio only, at 2,000 r.p.m., gives top speeds of 36 and 56.1 m.p.h., while 2,200 r.p.m. and 4.7 to 1 axle ratio provides comparable fourth- and fifth-gear speeds of 34.4 and 53.6 m.p.h. All these speeds are, of course, subject to the normal increase of 7 to 8 per cent governor run-up at light load. The standard Reliance speedometer reads to 60 m.p.h. and a higher-reading instrument is needed if higher speeds are contemplated.

The need for repeated heavy braking is not envisaged in motorway operation and brake performance is expected to be adequate provided anti-fade moulded linings, which have been standard equipment on the Reliance for the past 12 months or so, are fitted. A.E.C., Limited, stresses the need for proper attention to brakes, steering and suspension of vehicles operating continuously at high speed and suggests that continuous operation at higher engine speeds and outputs will necessitate more frequent attention to oil changes and oil-filter element renewals. Particular attention should be paid to tyre equipment and tyre loads should not exceed those specified by the manufacturer. Cases of doubt should be referred to the tyre supplier.

Time Saving

North Western Road Car Company has now covered a fair mileage with a modified Reliance—a Weymann Fanfare 41-seat coach that had been in service with the company since March, 1958, and had completed 75,000 miles without major engine attention at the time of conversion. Trials so far have indicated that the present express coach schedule between London and Manchester via Birmingham and Coventry of about 10 hr. can be reduced by as much as 1¼ hr. when the motorway is used. Fuel consumption checks appear to show that there will be little adverse effect. In covering 530 miles over the proposed new route embracing the motorway, with varying loads, fuel consumption has averaged 16.1 m.p.g., precisely the same as that returned by standard Reliance coaches used in loaded express services on ordinary roads.

Raising the gear ratio has apparently had no adverse effect on flexibility and acceleration. Acceleration figures taken by North Western with an empty vehicle at a weight of 6 tons 12 cwt. were given to us as 7 sec. from rest to 20 m.p.h. and 25 sec. from rest to 40 m.p.h. From our experience of the Reliance in MODERN TRANSPORT road tests, the last of which was of the overseas Reliance at 11¼ tons gross with a final-drive ratio of 4.7 to 1, we have no doubt of the ability of the AH470 engine, with its excellent low-speed torque, to make light work of a 4.08 to 1 axle at 9½-ton loadings.

Demonstration

Last week we were passengers in the coach during a demonstration run between the A.E.C. West Bromwich depot and St. Albans, taking in the length of M45 and M1. With about three-quarters of a full load the vehicle worked smoothly and quietly through the heavy Bimingham traffic without apparent greater than usual recourse to the lower gears. Once on M45 speed was quickly built up to about 60 m.p.h. and the seven-mile spur to the junction with M1 was covered in 9 min. and the 46 miles from that point to the St. Albans slip road in 45 min., in fairly heavy traffic throughout. The total motorway distance of 53 miles was covered in 54 min. and this included one slack to time acceleration from 30 to 60 m.p.h., which took 34 sec., and one timed mile at a speed of 65.5 m.p.h. Apart from the acceleration check, the slowest recorded speed while on the motorway was 59 m.p.h.—and the coach was overtaken by only one car throughout.

Also throughout the run, on a mild day, engine-oil pressure remained constant at 42 p.s.i. and coolant temperature was steady at 90 deg. C. Apart from the acceleration check, when fourth gear was used in the initial stages, the run was made entirely in top gear. Tyres fitted on the modified coach are standard 9.00-20 Goodyear Super 3T Nylon Traction Hi-Miler with standard-volume (not heavy p.s.v.) treads, in accordance with S.M.M.T. recommendations for high-speed operation. Tyre temperatures were not taken, but pressure checks showed that a starting pressure in the front tyres of 95 p.s.i. had risen by 20 p.s.i. at the end of the fast run and rear-tyre pressure had risen from 65 to 75 p.s.i., a result with which the Goodyear representative present was entirely satisfied.

The whole run was notable for quietness and smoothness and should be an entirely comfortable and pleasurable experience for the most timorous of passengers. The vehicle and its equipment were apparently all working well within their capacity and operators need have no qualms about operating this particular type of vehicle over the motorway.

North Western Road Car Company's modified Reliance, a 41-seat Weymann Fanfare, at A.E.C.'s West Bromwich depot ready to start on the run to St. Albans

★

MOTORWAY GUIDE

An A.A. Publication

UNDER the title *Guide To The Motorway*, a new pamphlet issued by the Automobile Association shows how the newly opened London—Birmingham motorway is likely to affect the pattern of long-distance traffic movement not only between London and the Midlands but over an area equivalent to three-quarters of the area of England, Scotland and Wales. A detailed study by A.A. officials shows that on journeys between South-East England or the Home Counties and the whole of Britain north of a line from Aberystwyth through Birmingham to the Wash, time may be saved by using the motorway, even where its use involves a greater mileage.

The new A.A. guide includes a large-scale map showing access points, service areas and the A.A. Motorway Control Centre and gives details of the association's 24-hr. breakdown service covering the new road. It also shows examples of some of the motorway signs and gives advice on motorway driving. The pamphlet can be obtained free from any A.A. office.

Get there quick - in Safety

Time may be the essence of the contract but remember that SAFETY also is essential. Keep to schedule, yet take no risks—fit NOTEK Foglite and Passlite lamps, and you'll see your way clear to do both. Nothing less than NOTEK Lamps meet Road Safety needs; nothing more in vehicle lighting is necessary. Black or Chrome from **£3.18.0d** complete.

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WITH its manoeuvrability, low loading height and alternative 'underfloor' power units providing long, trouble-free service between overhauls, the Karrier 'Gamecock' is the ideal vehicle for the busy operator. The new three-seat cab with panoramic windscreen affords maximum visibility and comfort for driver and two passengers and is insulated against noise and extremes of temperature, thus reducing driving fatigue to a minimum. Alternative wheelbases of 9′7″ and 11′9″ are available.

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NEWS FROM ALL QUARTERS

Eire Line Closing

The railway line linking Farranfore and Valentia Harbour, Co. Kerry, will be closed down by C.I.E. on February 1, 1961.

Grand Canal Service Withdrawn

Coras Iompair Eireann is to withdraw from trading on the Grand Canal, except for the carriage of through traffic between Dublin and Limerick only, from January 1 next. This means that barge cargoes will be carried from Dublin to Limerick and vice versa, but no traffic will be accepted for intermediate points.

Paper on Never-Stop Railway

A paper, "London Passenger Traffic, Continuous versus Intermittent Transport," is to be read by Mr. W. Yorath Lewis at a meeting of the Society of Engineers on December 7. It will deal with the traffic problem and will refer to the principle of the "never-stop" or automated railway. The meeting is at the Geological Society, Burlington House, Piccadilly, at 5 p.m. for 5.30 p.m.

Caspian Train Ferries

Russian plans to build a train ferry to run across the Caspian Sea are still being announced to provide quicker and cheaper train services between the Caucasus and Central Asia (see map in MODERN TRANSPORT, October 25, 1958). The first of five 6,000-ton diesel ferries is already being built and will be ready in 1961 for the journeys from Baku to Krasnovodsk, a distance of nearly 185 miles. Later a ferry will link Krasnovodsk with Makhach-Kala, it is stated.

P.G.E.R. Progress

The Pacific Great Eastern Railway, owned and operated by the Government of British Columbia, has turned an operating deficit of $215,893 in 1952 to an operating surplus of $2,102,000 in the first six months of 1959, compared with a surplus of $309,000 for the same period last year. The railway operates 790 miles of route from North Vancouver to Fort St. John and Dawson Creek. Passengers carried have increased from 48,374 in 1952 to 167,618 in 1958. Freight traffic has nearly trebled.

Feltham Tramcar Returns to London

One of the ex-Metropolitan Electric Tramways Feltham tramcars, No. 2099, which was purchased from London Transport by Leeds City Transport in 1949, was to return to London this week, where it will be preserved by the British Transport Commission in its collection of historical vehicles at Clapham. It has been presented to the Commission by a group of South London enthusiasts who formed a "Feltham" fund, to which London Transport has contributed. No. 2099 was one of 100 luxury tramcars built by the Union Construction and Finance Co., Limited, at Feltham, Middlesex; 54 were allocated to the M.E.T. for services in North and North West London and the remainder to the London United Tramways for use on the Shepherds Bush—Uxbridge route. They were regarded at that time as the most luxurious and efficient tramcars in the country.

Montreal Subway Proposal

A Canadian financial syndicate has offered to construct an initial 7.4-mile section of the proposed 23-mile Montreal subway system using the pneumatic-tyre system patterned on that which has been in service on the Paris Métro since 1957. The cost is estimated at $163 million.

Travelling Snack Bars in France

The International Sleeping Car Company has put into operation 11 snack-bar coaches with French expresses or expresses originating in France. Each coach consists of four second-class compartments and a special refreshment area with kitchen attached for the serving of short and long drinks, sandwiches, cold meals and quickly prepared hot meals.

New Bridge at Doncaster

A new welded-steel girder bridge, wide enough for two lanes of traffic in each direction, has taken the place of the Old Mill Bridge, a notorious bottleneck, over the River Don on the Great North Road (A1) at Doncaster. It was opened last Friday by H.R.H. the Princess Royal, and named St. Mary's Bridge, thus restoring to use the name of the 16th-century bridge on the same site.

Polish International Train

Changes will be made next year in the international railway services running through Poland. For example, a Carpathian express will be introduced in May, 1960: It will connect Warsaw with Bucharest via Przemysl, Lwow, Stanislwow and Cernauti. It is also proposed to run a special tourist train from Berlin to Moscow via Warsaw and Brest Litovsk in the summer.

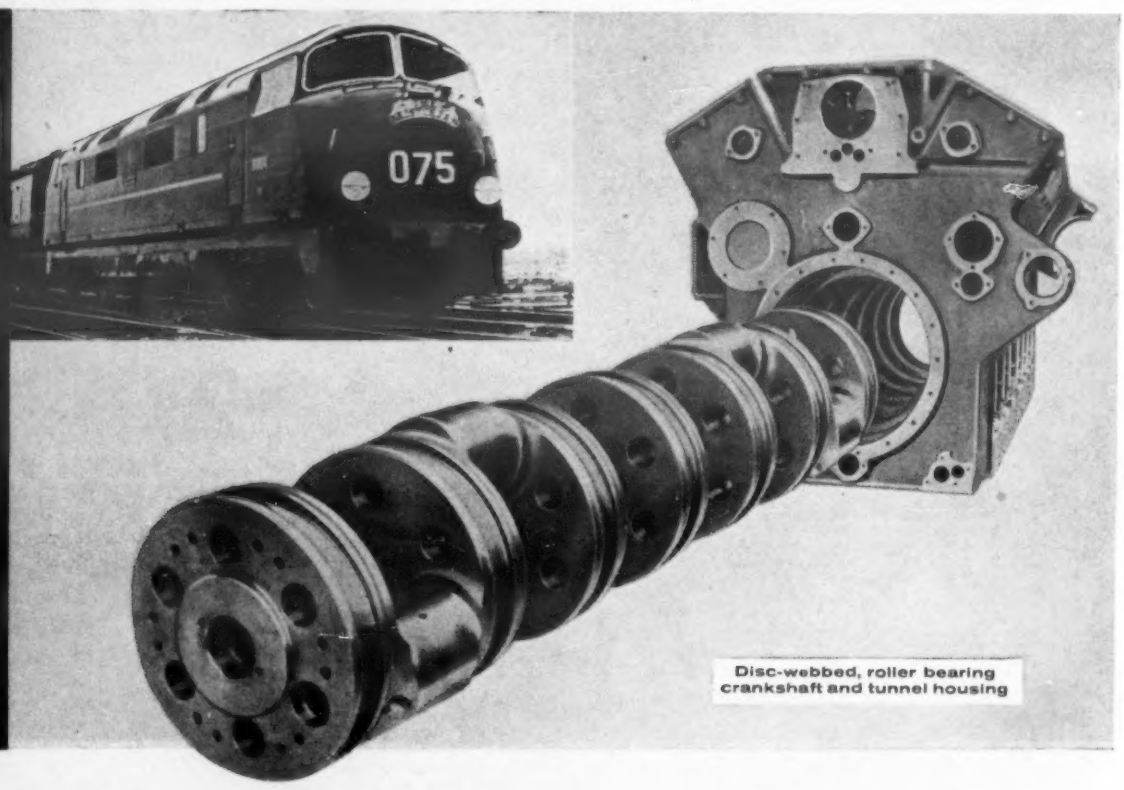
Brixton Roundabout Scheme

Work will commence shortly on the realignment and widening of St. Matthew's Road, Brixton, between Brixton Hill and Effra Road, providing a complete one-way traffic operation round St. Matthew's Church site instead of the partial one-way traffic arrangement at present operating in St. Matthew's Road and Effra Road. This improvement will help to alleviate traffic congestion at the Lambeth Town Hall intersection.

Unused Wagons Charge

Replying to recent allegations by Mr. Duncan Bailey, chairman of Charles Roberts and Co., Limited, the B.T.C. says that the 4,000 new steel wagons stated to be standing idle in a Cumberland siding had been ordered in 1956 when there was a serious wagon shortage. It had not been possible to put the wagons into full use because of the reduced level of coal sales, but it was expected they would be progressively absorbed with the gradual improvement in the iron and steel business. The 400 wagons unused in South Wales had been specially built to a design agreed between the railways and the receiving company. But difficulty was found in handling the type of coupling associated with these heavy wagons, after delivery. A new type was being developed to bring them into service. Mr. Bailey still wants an independent inquiry.

Maybach rail traction diesel engines—from 400 to 2,000 hp can achieve 16,000 hours between major overhauls . . .



Disc-webbed, roller bearing crankshaft and tunnel housing

...ANOTHER ENGINEERING ADVANCE FROM BRISTOL SIDDELEY

Bristol Siddeley Engines Limited produce Maybach* rail traction diesel engines. Covering a power range from 400 to 2,000 hp, these diesels are amazingly reliable and have shown that they can achieve major overhaul lives of 12,000 to 16,000 hours!

The *proven* basic design features of the whole range (straight 4 to 16-cylinder V) are the same, and each unit can be turbo-charged, or turbo-charged and intercooled. The range operates between 1,200 and 1,600 rpm and *combines the best performance and design qualities of high, medium and low-speed diesel engines:* light weight and compactness, excellent thermal efficiency and extremely long life.

Advanced design features
The pistons are pressure-oil cooled. This gives very efficient heat dissipation and reduces liner and gas ring wear to a minimum. The roller bearing, disc-webbed crankshaft is exceptionally rigid within its tunnel housing, and in practice withdrawal is not normally necessary before 12,000 hours running. So low is big end bearing wear that in some cases the protective lead flash has been found to be intact when examined after 15,000 hours running!

Since the cylinder bore and stroke, and the majority of components, are identical in all models, spares stocks are considerably reduced. Servicing also has been greatly simplified because much thought has been given to accessibility and the removal of components. And the engines are suitable for both hydraulic and electric transmission.

World-wide application
Maybach rail traction diesel engines are in service all over the world and have built up an unsurpassed record for reliable and economic operation. Bristol SiddeleyMaybach engines power the new diesel hydraulic locomotives of British Railways Western Region and an additional order for a large number has just been placed.

For further information please write to: Maybach Sales Manager, Bristol Siddeley Engines Limited, PO Box 17, Coventry, England.

**Under licence from Maybach-Motorenbau GmbH*

BRISTOL SIDDELEY ENGINES LIMITED

COMMERCIAL AVIATION

B.O.A.C.-T.C.A. Agreement

FIJI AIRWAYS

IT was announced jointly last week by Trans-Canada Air Lines and the British Overseas Airways Corporation that in the interests of providing improved service to the public an agreement had been reached between T.C.A. and B.O.A.C. This was achieved by Mr. Gordon R. McGregor, president of T.C.A., and Mr. Basil Smallpeice, managing director of B.O.A.C. This agreement will ensure that the services between Canada and the United Kingdom will be offered at times best suited to the needs of the expanding public demand. It will also provide for the integration of schedules between Canada and the U.K. and of other passenger and cargo services, including the interchangeability of tickets. The offices of both companies will conduct business on behalf of each other. The agreement will come into effect on March 1, 1960. Mr. Smallpeice subsequently went on to Bombay for further talks between Air India International, Qantas Empire Airways and B.O.A.C. on a possible partnership arrangement.

Dublin Airport Traffic

In the three months to September 30, 1959, Dublin Airport handled 10,307 aircraft movements, of which 9,083 came within the air transport category. The passengers numbered 303,466 and freight handled totalled 2,560 tons.

B.O.A.C. Comets to Caribbean

The British Overseas Airways Corporation is to extend its Comet jet services to the Caribbean. Flights, which will begin next February, will fly via New York, Nassau and Montego Bay. Six services weekly will operate on this route, including three direct flights to Jamaica and three flights to Jamaica via Nassau. Flying time by Comet 4 from New York to Nassau will be three hours and to Jamaica four hours. In addition to the daily Monarch flights between London and New York, B.O.A.C. also plans to operate three Comet flights weekly with first- and economy-class accommodation, beginning in February. These services will leave London on Tuesdays, Thursdays and Saturdays, and New York on the following days.

Boeing Negotiating for Vertol

Negotiations for the acquisition of Vertol Aircraft Corporation of Morton, Pennsylvania, by the Boeing Airplane Company, of Seattle, have been announced. Mr. William M. Allen, president of Boeing, said that negotiations would be based on the issue of two Boeing shares for three Vertol shares. Vertol has approximately 673,000 shares presently outstanding for which approximately 449,000 shares of Boeing will be issued. This would increase the number of Boeing shares outstanding by about 6 per cent. If negotiations are successful it is expected that operations now conducted by Vertol would continue under the present management and at its present location as the Vertol Division of Boeing Airplane Company.

Closed Circuit Television for U.A.L.

Closed circuit television for widespread display of flight arrival and departure information has been installed in the United Air Lines passenger terminal at O'Hare Field, Chicago. The lobby and corridors of the passenger terminal occupy more than 40,000 sq. ft. of floor space and 13 TV monitor sets are located at strategic points throughout the area so that travellers are always within convenient viewing range. The monitors are connected by coaxial cable to a desk console which contains two TV cameras focused on source boards. The flight numbers, gate positions, arrival and departure times are spelled out with white plastics letters on black strips of felt. A similar system will be used at United's new passenger terminal at New York International Airport (Idlewild).

Control of Fiji Airways

Tasman Empire Airways has bought a 50 per cent share in Fiji Airways at an estimated cost of £82,000. This was announced recently by the New Zealand Minister of Civil Aviation, Mr. John Mathison, who said that major policy decisions concerning the airline, such as proposals for new routes outside the Fiji Islands or any proposals for increased capital expenditure would require the agreement of the Australian and New Zealand Governments. Mr. Mathison said it was possible its operations might be extended to nearby Pacific islands. At present the company, which owns a fleet of two de Havilland Heron and three Drover aircraft, operates over a network of 561 miles in the Fiji group of islands. Its most important service at present connects Suva with Nandi. Mr. Mathison said the Australian and New Zealand Governments had agreed to participate equally in the ownership of Fiji Airways. The shares would be held by Qantas and T.E.A.L. The inter-governmental arrangement also provided for participation in the ownership of Fiji Airways by other British interests.

North Atlantic Traffic

A substantial increase in North Atlantic air cargo in the third quarter of this year as compared with the same three months of 1958 has been reported by the International Air Transport Association. Loadings rose 24.5 per cent to 8,210,815 kg. (18,063,793 lb.). This was the third successive quarter this year to show such a large increase. Cargo carried in the first nine months of 1959 totalled 22,571,850 kg. (49,658,070 lb.) and represented a 34 per cent rise over the same months of 1958, when 16,845,950 kg. (37,061,090 lb.) were flown. Scheduled passenger traffic in all classes during July, August and September increased by 12 per cent to 523,031 as compared with the same period last year. Mail carryings went up 10.9 per cent in the third quarter to a total of 2,776,399 kg. Of the passengers 411,272 people, or 78.6 per cent of the load, flew economy class—an increase of 28.6 per cent. There were 21,555 passengers, or 4.1 per cent, in tourist seats—a decrease of 69 per cent—and first-class and de luxe passengers numbered 90,204, or 17.3 per cent of the total. This represented an increase of 16.2 per cent over last year's comparative quarter. The decline in tourist-class traffic was due to a certain extent to the sharp drop in tourist seating capacity offered on the route. There were 101,507 tourist seats available in the third quarter of 1958 as against 36,721 in the same period this year. The airlines carried more passengers with fewer flights by using larger aircraft and providing more seats in the economy class. Scheduled flights in this year's third quarter dropped by 1.8 per cent to 10,066, but seating capacity rose by 5.2 per cent compared with the corresponding period of 1958. Load factors averaged 72.2 per cent, an increase of 4.4 per cent.

LOSS TO BRITISH RAILWAYS

The late Mr. FRANK GRUNDY, M.Inst.T.

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Mr. Frank Grundy, whose death was reported with deep regret in our last issue, was appointed traffic officer, British Railways Central Staff, at the end of 1957, having from April 1 of that year been chief traffic manager, North Eastern Region. He began his railway service with the Lancashire and Yorkshire Railway at Bury in 1915 and then served with the R.N.V.R. from 1917 to 1919. After training at stations and district offices, he joined the chief goods manager's staff at Euston, L.M.S.R., in 1925. He worked in various headquarters sections thereafter until 1933, when he joined the then newly-formed chief commercial manager's research section. Five years later Mr. Grundy went to the L.M.S.R. staff college at Derby and later in 1938 became goods agent at Accrington. After holding a similar position at Bury (1939-41) he became assistant to district goods manager, Bolton, in 1941; head of merchandise services section, chief commercial manager's office in 1943; and, also in that year, goods agent, St. Pancras and Somers Town. He was appointed assistant to chief commercial manager (goods) early in 1944, district goods manager, Wolverhampton, in May, 1945, and assistant chief commercial manager (goods) in 1946. After the establishment of the British Transport Commission, he was made executive officer (goods) at Railway Executive headquarters and then, in March, 1950, became assistant commercial superintendent, Western Region. He transferred to the North Eastern Region as commercial superintendent in 1954, and then became chief commercial manager in 1955. During the 1939-45 war Frank Grundy's services were lent for a period to the Ministry of Food, where he performed yeoman service as an assistant director of transport at headquarters and as deputy divisional food officer (North West) responsible for transport and warehousing. He was a member of the Railway Clearing House management committee and was a member of the Institute of Transport. He was 59 years of age.

IN PARLIAMENT

B.R.S. Parcels Service Delays

SHIPBUILDING AT THE M.o.T.

INSTANCES of B.R.S. (Parcels), Limited, "falling down lamentably" were raised in an adjournment debate in the House of Commons on November 25 by MR. C. OSBORNE. He was referring to three consignments of transformer parts dispatched from Leicester on various dates in October or November: the first took 12 days to reach Farnborough (Hants), the second took a week to get to the same destination, the third was reported lost nearly a month after dispatch (it transpired that the consignment has now been traced by B.R.S., having lost its label).

Mr. Osborne said he was not attacking the B.R.S. organisation generally—in some respects it did a fine job—nor nationalisation. They had to accept that and were not going to alter it. But there was a great dissatisfaction with certain sections of the undertaking. MR. JOHN HAY, the Joint Parliamentary Secretary, M.o.T., did not deny this. He attributed the delays referred to to a very heavy surge of traffic in September-November this year. This was not unknown to all parcels carriers at this time of the year. It was the dilemma of the peak load, which could be met only by having surplus capacity which stood idle at other times.

B.R.S. (Parcels) was in a fairly good position to meet this as it had 4,000 vehicles and could call spare vehicles from less busy depots. It was taking steps to improve service, but, being in a competitive business, it had asked him to keep its plans confidential to avoid giving away useful information. During the four weeks covered by the complaints it had carried 250,000 more packages than in the corresponding period of 1958. This meant much greater pressure at depots, especially at the one just outside London where, it was believed, the three consignments were handled.

Questions on British Railways

MR. D. PRICE asked the Prime Minister whether he would place the British Transport Commission directly under the Minister of Transport so that British Railways might be directly responsible to the House of Commons for its efficiency. MR. HAROLD MACMILLAN said this would be a very drastic change and it would require new legislation. Mr. Price said he wanted a reversion to the war-time situation when the Minister of War Transport was prepared to answer in the Commons questions about some transport operations.

Committee on Rural Bus Services

MR. R. SPEIR asked the Minister of Transport whether his attention had been drawn to the fact that Professor D. T. Jack, chairman of the committee set up to report on the problem of rural transport, had now been appointed a member of the Advisory Commission on Central Africa. MR. E. MARPLES said that Professor Jack was appointed to the Advisory Commission on Central Africa with his agreement. He proposed to appoint a vice-chairman of the committee on rural bus services to steer its work while Professor Jack was occupied with the work of the Commission.

Shipbuilding at the Ministry of Transport

The Minister of Transport, MR. ERNEST MARPLES, was tackled by MR. JAMES CALLAGHAN on the functions in respect of shipbuilding and shiprepairing which he had acquired from the Admiralty. Was it in the best interests of those industries? Mr. Marples could only promise to do his best for shipping, as for road and rail transport. One of the major points to which he would have to direct attention was the nationalisation and modernisation of yards. We had no hope of competing with the rest of the world unless we had the tools to build ships efficiently and quickly. The other problem was flag discrimination and nationalism.

Travel to London Airport

Answering questions about the possible monorail to London Airport, the Minister of Aviation, MR. DUNCAN SANDYS, said that the first task was to improve the road, and it was being progressively improved. When the work was completed the journey between the Cromwell Road terminal and the airport should not take more than about 23 or 25 minutes. If we were to introduce a monorail or a similar system we might cut 10 minutes off that time. He was not saying that that was not desirable, but up to now these schemes had foundered owing to their high cost and to the fact that other schemes had claimed priority in the expenditure of Government money.

Forthcoming Events

December 7.—Institute of Transport (Metropolitan). Annual general meeting and paper by Mr. E. M. Robbins, "Transport History for Transport Men." At 80 Portland Place, W.1. 6 p.m.

Institution of Railway Signal Engineers (Bristol). Paper by Mr. V. K. Openstow, "Modern Trends in Hump Yard Engineering." At Bristol Temple Meads Station. 6 p.m.

Society of Engineers. Paper by Mr. W. Yorath Lewis, "London Passenger Traffic: Continuous v. Intermittent Transport." At Geological Society's Rooms, Burlington House, W.1. 5.30 p.m.

Institute of Transport (Darlington). Paper by Mr. W. D. Andrews, "General Principles of Work Study as Applied to Transport." At United House, Grange Road, Darlington. 7 p.m.

Institute of Transport (Sheffield). Paper by Mr. R. B. Stoker, "A Shipowner Looks at the St. Lawrence Seaway." At the Royal Victoria Hotel, Sheffield. 7.30 p.m.

December 8.—Institute of Transport (Scottish). Paper by Mr. M. G. Maycock, "A Visit to the Russian Railways." At 66 Bath Street, Glasgow. 6 p.m.

Institution of Mechanical Engineers (Automobile). Paper by Mr. A. E. W. Austen, "Some Investigations into Cold Starting Phenomena in High-Speed Diesel Engines." At 1 Birdcage Walk, S.W.1. 6 p.m.

Institute of Transport (Gloucester and Cheltenham). Paper by Mr. J. E. Oxley, "Inland Waterways." At the Midland and Railway Hotel, Gloucester. 7 p.m.

Institute of Transport (Yorkshire). Paper by Mr. D. L. Munby, "Some Economic Problems of Transport." At the Griffin Hotel, Leeds. 6.30 p.m.

December 9.—B.R. (Southern) L. and D. Society. Paper by Mr. J. F. Knight, "Unilever and the Approach to the Housewife." At Chapter House, St. Thomas' Street, S.E.1. 6 p.m.

Institute of Transport (Southern). Paper by Mr. G. Armstrong, "Where is the Bus Industry Heading?" At Harbour Board Offices, Southampton. 5.45 p.m.

December 10.—B.R. (L.M.R.) L. and D. Society. Paper by Mr. A. N. Butland, "The Work of the Civil Engineering Department." At Clerical Staff Dining Club, Cardington Street, N.W.1. 6.45 p.m.

Institute of Transport (North Western). Debate with British Railways (East Lancs) Debating Society, "That Private Cars should be Barred from the City Centre during Peak Periods." At Gas Service Centre, Manchester. 6.30 p.m.

Institute of Transport (South-Eastern). Paper by Mr. R. E. McOregal, "The New Maidstone By-pass and the Future Road Pattern of Kent." At Sun Hotel, Chatham. 7.15 p.m.

Institution of Mechanical Engineers. Discussion, "Practical Training of Engineers." At 1 Birdcage Walk, S.W.1. 6 p.m.

December 11.—Institution of Highway Engineers. Annual general meeting (11.45 a.m.) and annual luncheon (12.30 p.m.). At Park Lane Hotel, London, W.1.

"ORIANA" DECKHOUSES

Large Welded Aluminium Structure

WHEN the 40,000-ton *Oriana* goes into operation on the new joint Australian and Pacific service developed by the Orient Line (her owner) and P. and O., she will be noteworthy not only as one of the most advanced passenger-carrying ships in the world, but also for the scale on which aluminium has been used in her construction. By adopting welded aluminium fabrication for the whole of the vessel's superstructure above the strength deck, enough weight has been saved to allow the passenger accommodation to be increased to the extent of a complete deck, without reducing stability. In the eight tiers of deckhouses, three of which extend the full 450-ft. length of the superstructure, 1,000 tons of

All-welded aluminium deckhouse structure of the Orient Line vessel "Oriana" seen under construction at Barrow before her recent launching

aluminium plate and sections were used, about 870 tons being supplied by the Northern Aluminium Co., Limited.

Planning for the use of aluminium on this scale necessarily began several years ago, and preliminary investigation to settle such questions as the best welding procedures and techniques to be adopted was undertaken in 1955. In that year a large experimental deck panel was constructed in co-operation between the shipbuilders, Vickers-Armstrongs (Shipbuilders), Limited, and Northern Aluminium. The general method of construction used for the panel was to join the plates by butt welds laid on to permanent backing bars wherever possible. Though at that time experience of welded aluminium deckhouse construction was, of course, not so extensive as it is now, this system had already been successfully used for other ships, and it was eventually adopted for the *Oriana*.

Fabricating Methods

The welding itself was carried out using consumable-electrode argon-shielded-arc equipment. The widespread use of welding as a means of fabricating aluminium structures is comparatively recent, but the modern fluxless processes of this type are now thoroughly established and have brought the same ease of construction in aluminium that the shipbuilder is accustomed to find with steel. Among the items of aluminium welding equipment used by Vickers-Armstrongs for work in the *Oriana* was a Quasi-Arc gantry type of machine (capable of Sigma welding of aluminium and Fusarc welding of steel) for fillet welding; Quasi-Arc tractor-mounted equipment for butt welding both in the shop and aboard the ship; and Quasi-Arc—B.O.C. Lynx sets for manually operated assembly welding.

Prefabrication was adopted as an essential technique in the building of the aluminium superstructure. Deck panels with a typical size of 25 ft. square and weighing about two tons were built up as units, and several larger structures such as internal stairways were also fabricated and lifted aboard complete. It is an advantage to use aluminium plates of the largest available size. Until recently there was no hot mill at work in this country capable of supplying aluminium plates in widths greater than about 7 ft.

To overcome this problem until its new wide rolling mill comes into operation next year, Northern Aluminium supplied Noral welded plate for the *Oriana* and other applications. This is aluminium alloy plate of up to 11 ft. wide, produced by the automatic welding together of two plates edge-to-edge in a special jig. The weld bead on the resulting composite plate can if desired be ground flush, on both sides if necessary, making the finished plate comparable in appearance with ordinary rolled material. The quality of the welding, moreover, is such that for most purposes not involving forming the presence of the weld need hardly be considered, it is stated. To ensure flatness, many of the pieces of welded plate were stretched after welding.

A 60-ft. plate saw, like the stretcher in use at Rogerstone works, is capable of cutting plates to a hitherto unattainable degree of accuracy and with guaranteed edge straightness. By the use of this equipment it was possible to supply the aluminium plates cut to the exact required widths, thus reducing the amount of shipyard plate trimming work to the minimum.

Extruded Sections

As far as possible, extruded aluminium alloy sections were used in the *Oriana* superstructure for girders and other members, as well as for the usual deck beams and stiffeners, rather than members fabricated from plate. This has meant that the proportion of extruded sections in the structure is higher than is usually the case in work of this kind. Some unusually large extrusions were included, up to 16 in. in overall dimension and with a weight per foot of over 15 lb. For beams and stiffeners incorporated in the prefabricated deckhouse panels a special series of sections with a tapered bulb was used, as an alternative to the better-known square-bulbed British Standard aluminium shipbuilding sections.

The building of a ship with this 1,000-ton aluminium superstructure, by far the largest welded aluminium structure ever built, not only

(*Continued in next column*)

(*Continued from previous column*)

indicates the progressive outlook of those responsible for its design, but at the same time clearly demonstrates the great progress that has been made in the development of sound techniques for the employment of welded aluminium in shipbuilding. Less than 10 years ago a shipyard application of aluminium on the scale of that in the *Oriana* would have hardly been predictable.

GLASS FIBRE STRENGTHENER

Service from Holt Repair Materials

NOW that glass fibre has become almost commonplace in the construction of commercial vehicle cabs, wings and other bodywork items and has proved its worth in the construction of bus indicator boxes, complete roof structures, and such items as timetable frames, it is timely that kits for its repair should be available. Holt Products, Limited, of Vulcan Way, New Addington, Croydon, Surrey, provides a complete range of cold curing components including resins, hardeners, and glass fibre of various types for repair work and also makes available some useful ideas for repair or strengthening of other structures with glass fibre as well as do-it-yourself information on new glass-fibre products.

If a mould or frame is used to make up a glass-fibre component or section a wax release agent is needed. Glass-fibre reinforcements or patches are made in various types—chopped strand mat for general reinforcement, scrim for laminating to a complex mould, tissue for a smooth surface and woven ribbon for binding edges or giving extra strength at vital points, as where fixing holes are to be provided. Laminating resin, Thixotropic paste resin for assistance in applying the laminating resin to vertical surfaces, catalyst or hardener, and filler powder for extra surface hardness are also available.

Van Floor Repairs

As already indicated, apart from repairs, new work can be tackled with these materials, such as reinforcement of existing floors of commercial vehicles. Such strengthening need weigh only one-fifth of conventional steel reinforcement and can, of course, be repaired with the same materials if it sustains damage. Such a floor can be made smooth or rough in texture to suit requirements and has the merit that glass fibre is resistant to damage from wet and corrosive loads. If an existing wooden vehicle floor is being tackled, the floor must first be thoroughly cleaned and dried. It is important to see there is no grease left in the pores.

The next step is to score the surface of the floor either with a file or a coarse sanding disc to give a rough surface and to ensure good adhesion of the first coat of resin. Holts recommend that additional hardness and abrasion resistance be imparted by adding three parts of abrasive grit to 10 parts of the first gel coat of laminating resin. Washed sharp sand, carborundum grit or any of the abrasive grits in common use are suitable. Sand is one of the cheapest grits, but care must be taken that it is washed and thoroughly dried. Ordinary builders' sand as used with cement would not be suitable. About ½ per cent of hardener (compared to the weight of resin) should be added to the mixture and the whole brushed over the floor in a thick even coating.

When the first coat has reached its tacky stage another coat of the same mixture should be brushed over the surface and the first layer of chopped strand mat glass fibre should be laid down and impregnated; after that a further coat of resin and a further layer of mat should be applied. The number of layers of glass mat which are applied depends on the required thickness of flooring. Three layers of 1 oz. per sq. ft. chopped strand mat will give a thickness equal to $\frac{1}{16}$ in. steel flooring. If a thicker application is required further layers of glass fibre can be applied. If the vehicle is only a light van and a great thickness of flooring is not required glass scrim is a suitable finish, but in most cases at least one layer of chopped strand mat is needed in order to give a sufficiently rigid and thick surface to protect the wooden flooring from bruising under the impact of loading.

Finishing Methods

When the required number of layers of glass mat have been applied the whole should be rolled with a split washer roller in order to make the laminate a solid mass. After this the laminate should be allowed to cure to a firm tacky state. If a fairly smooth surface is required the layers of glass impregnated with the laminating resin containing sand will be sufficient and the laminate should be allowed to cure to its final state; if the application is required for heavy-duty work, it may be necessary to have a non-skid floor so that the load will not move about while the vehicle is in motion. For that purpose one part of laminating resin and three parts of washed sharp sand with some hardener should be mixed together into a thick paste which can be trowelled into position over the glass laminate. Care should be taken that the quantity of hardener paste is not too great as time will be needed to trowel the material on to the glass laminate and level it out. When the surface is sufficiently level the mass should be allowed to harden off to its final state and the result will be a completely non-skid surface which will withstand the impact of heavy loads for a long period.

Should damage occur to the floor it can be patched with chopped strand mat and laminating resin with or without the addition of sand. By similar means but without the use of abrasive leaky cab roofs and other bodywork deterioration can be remedied.

A filter-funnel for use on airfields for overwing hand fuelling has been introduced by Simmonds Aerocessories, Limited, a member of the Firth Cleveland Group. The funnel is also suitable for use in filling barrels and so on. It incorporates two Fram filter separator cartridges which remove water and dirt contaminant. Any water in the fuel is rejected by the cartridges and directed to a sump, from which it can be drained. The cartridges have a life of one year. The funnel has an earthing connection; it weighs 16 lb., and can handle flows up to 25 (imp.) g.p.m.

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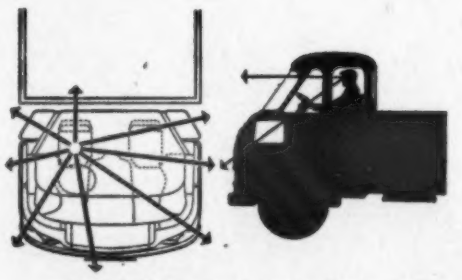

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OIL AND THE RAILWAYS

Transportation Club Address

AT the last dinner of the Transportation Club to be held in the premises at 44 Wilton Crescent, which close on December 18, Mr. Dennis Handover presided and indulged in some nostalgic reminiscences of the earlier days of the club and of the value it had had in putting members in touch with one another and in the cross-fertilisation of ideas.

Million Tons by 1965

Mr. Basil Cooke then introduced the principal guest, Mr. Christopher T. Brunner, a director of Shell-Mex and B.P., Limited, who addressed members on the subject of railways and oil. Last year, he said, British Railways used 77,000 tons of oil, much of it for diesel multiple-unit stock and shunters. The peak of the full diesel programme of British Railways would not be reached until nearer 1963, when, according to the latest estimates, consumption would probably be in the order of 900,000 tons in that year. From then on the quantity would go up a little more, with the million-ton mark within sight by 1965.

Although such figures were a welcome addition to the oil industry's trade in this country, they were not in any sense overwhelming, and would make only a modest call on overall resources. Indeed, one million tons of oil in 1965 would in that year represent no more than 2.2 per cent of total estimated inland consumption of petroleum products in this country, excluding refinery consumption and bunkers. "But don't misunderstand me," he continued. "A million-ton market is not one which we shall regard as just a drop in the ocean of oil in the 1960s. That is not our philosophy. We look on every market, whatever its size, as a springboard and not as a sofa."

A Tailored Product

The product was always tailored to the requirements of the customer. For that reason, particular attention was being given to quality as well as quantity, and to the physical arrangements for the handling and delivery of the oil to the railways. An active part was being played in the training of personnel. As long ago as 1956, with the approval and co-operation of British Railways and the engine makers, Mr. Brunner's undertaking producted an instructional film, *The Diesel on Rail*, extensively used by British Railways in training staff.

Rather more than half of the oil for the railway diesels was supplied direct from the Shell and British Petroleum refineries in this country. Extra storage was being provided at several depots, a more extensive use of rail tank cars was planned, and also new and improved methods of handling, including equipment which accelerated the rate of loading. British Railways, on their part, would be faced with the need to increase the oil storage capacity of some three million gallons, perhaps more than four-fold by 1964; in the meantime, a certain amount of temporary storage in the form of rail wagons and storage tanks was being lent.

Supplies

Massive expenditure had been undertaken by the oil companies in recent years throughout the world to assure supplies. In 1958—to quote but a single year—more than £2,500 million was spent by the industry as a whole on exploration and the development of reserves in the free world. Those efforts had succeeded in greatly reinforcing reserves. Furthermore, new methods of producing oil were continually being developed. In consequence, the proportion of reserves to production was being considerably increased year by year. Taking last year's level of production, proven reserves, or working reserves, and therefore a minimum, were equal to close on half a century's supply.

The oil position had been still further strengthened by the discovery and development of new oil fields in many parts of the world. Canada, the Sahara, Nigeria and Libya, to quote but a few new sources, were being rapidly developed. Active prospecting was also taking place in regions as far distant as the Arctic and New Guinea and new methods were being developed for extracting oil from the vast reserves of shale and tar sands, which were particularly extensive in Northern Canada. The Middle East—no single integrated area—needed the markets of the West, and the revenue, for its development even more than the Western world needed Middle East oil for its industry and transport. Oil was by far the biggest industry and overwhelmingly the major source of revenue of the Middle East states. There were no markets for them which could really take the place of the Western World. The oil industry's problem over the years ahead was one of supplies outrunning demand and not of shortage.

Transport

On the transport side, a considerable volume of new tanker tonnage had been built for the replacement of older vessels. Reserves of tankers were also at a substantial, some might say an excessive, level. "The fleets of my own parent companies, Shell and British Petroleum, for instance, comprising owned and chartered vessels, total some 16 million deadweight tons and will increase by about five million tons by 1965. Indeed, never in its hundred years' history has the world oil industry displayed such features of strength on every front."

Growth of oil consumption also meant more business for the railways. With the expansion of oil markets in the U.K., his company and its associates were already spending at the rate of £4 million a year on rail transport. For speed in the bulk carriage and direct movement of oil they would, of course, continue to make as much use as economically possible of rail services. In fact, the oil industry was, if not the biggest, certainly one of the largest of the private customers of British Railways. It was true that, with the coming of the diesel, the oil industry had a material stake as a fuel supplier. But there was more to it than that. A healthy, vigorous and up-to-date transport system went right to the root of the economy, and benefited industry and the community as a whole. For that reason, the success of British Railways' modernisation plan would be widely welcomed as a major factor in national prosperity over the next two or three decades, and beyond it.

A vote of thanks was proposed by Mr. R. B. Hoff, chief supplies officer, B.T.C.

Meat Transport Hygiene

IN VEHICLES AND PERSONNEL

RECOMMENDATIONS for the hygienic transport and handling of meat are contained in a booklet under that title issued jointly by the Minister of Health and the Minister of Agriculture (H.M.S.O., price 9d.). It outlines best practice in the construction of vehicle bodies for this class of work, mechanical loading of carcase meat, methods of handling other classes of meat, suitable design of retail delivery vehicles, ways of cleaning vehicle interiors, and personnel requirements. The code has no statutory force and observance or non-observance of any of its recommendations will not necessarily amount to compliance or non-compliance with particular requirements in the Food Hygiene Regulations, 1955-57.

The authors say that only baled bacon can be regarded as satisfactorily carried on platform-type vehicles; for all other classes of meat not packed a boxvan is desirable. The desirability of non-slip flooring is then discussed—the booklet does not preclude the possibility that operatives may have to enter the vehicle—and in a section on interior side panels it is suggested that unalloyed aluminium has been found in some cases to leave black marks on carcases which have cone into contact with it. It is better to paint the surface with epoxy paint or to spray it with a synthetic resin or cellulose lacquer. Recommended aluminium alloys are referred to.

Handling Gear

Meat which is not adequately wrapped should always be hung, and it should always be possible to hang home-killed meat, the booklet recommends. Mechanical overhead loading gear, it is pointed out, should have all parts readily accessible for cleaning; it reduces contact between the meat and the loader's clothes as far as possible, and the meat is held out of contact with the floor. On delivery vans it is suggested that, unless the meat is adequately wrapped or in covered containers, there should be a partition or sliding bulkhead separating the driver's cab from the rest of the vehicle.

Protective clothing used in the transport of meat should be so designed as to give adequate protection both to the wearer and the meat. Light-coloured cotton caps or shoulder pads covered with impervious material are useful adjuncts. Many local authorities and a number of voluntary bodies, it is stated, arrange classes and lectures on food hygiene which food handlers could attend.

A.C. Electric Locomotive

(*Continued from page 7*)

coupled to the road wheels by Alsthom-type link drives.

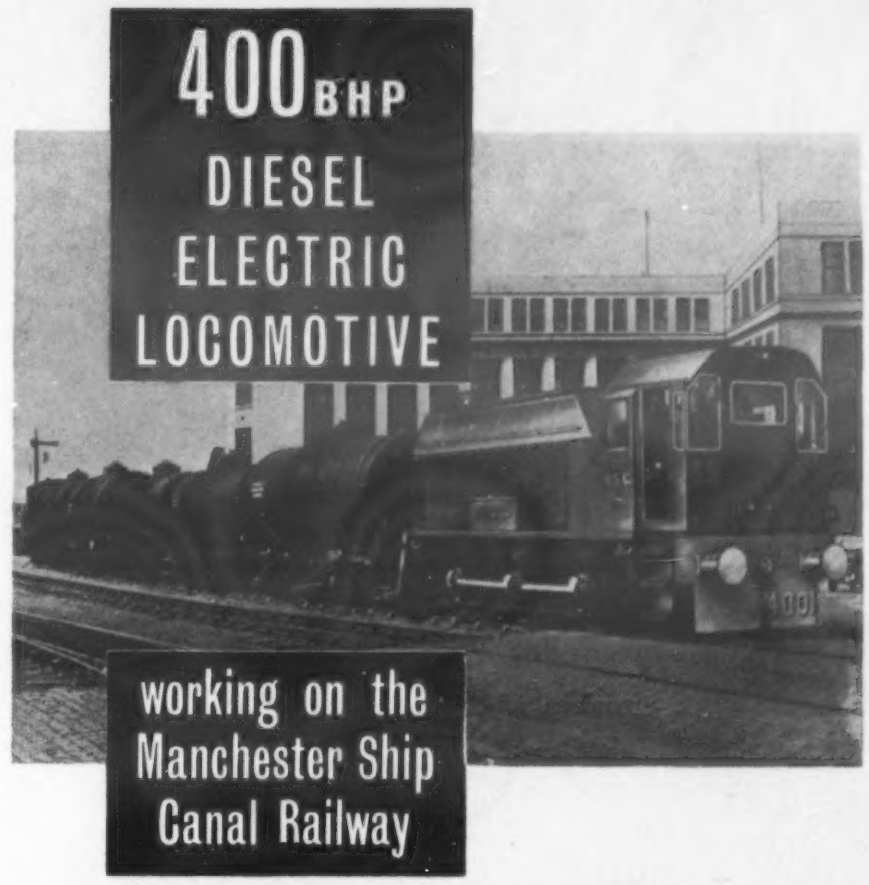
The wheel sets are carried in double row spherical roller bearing axleboxes which are connected to the bogie frames by rubber-bushed radius arms giving a cushioned resistance to lateral impacts. The primary-coil springs are mounted on equalising beams underslung from the axleboxes in chevron rubber mountings and hydraulic dampers are fitted.

Secondary Suspension

The Alsthom-type secondary suspension consists of a vertical column between the underframe and bogie fixed bolster with large conical rubber bearings at either end. Tractive effort is transmitted through the rubber, but fore and aft angular movement of the column is controlled by manganese bearing pads while side movement is controlled by pre-loaded double-acting springs. A small proportion of the body weight is taken on four-coil support springs on each bogie through manganese-steel pads.

Under small transverse accelerations the body oscillates about the lower pivot only, but under the influence of higher forces, sufficient to overcome the pre-loaded side control springs, the body can move sideways in relation to the bogie. The combined effect is that the period of natural oscillation is governed to a large extent by the severity of the exciting force. Absence of body roll with this type of suspension is particularly noticeable. Separate brake cylinders are provided for each wheel and the employment of reaction support of the inner hangers gives a very simple brake rigging.

Two new films (35 or 16 mm.) available for distribution from Esso Petroleum Co., Limited, both made in Eastman Colour by the company's own film unit, are *Your Petrol Today* and *Hook, Line And Sinker*. The first is broadly aimed at the general motoring public and shows the kind of research carried out at the company's laboratories near Abingdon. The second depicts the maiden voyage of a deep-sea line-fishing vessel and there is no record of any British film previously made on this traditional but somewhat unusual form of fishing. Built at Peterhead, the *Glenstruan* of Aberdeen carried the camera unit on a three to four weeks' voyage far to the north in search of halibut which is the principal catch of the deep-sea line-fisherman. Icebergs, whales and glimpses of the snowbound coast of Greenland were all caught by the camera, as well as some magnificent sky effects above the Sea of the Midnight Sun.



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AIR SUSPENSION ON RM BUSES

Operational Trials with 50 Vehicles

OPERATIONAL trials are now being undertaken by London Transport with rear-axle air suspension on 50 of its RM-type buses. The specially fitted buses will be based on Poplar Garage, where some 30 of them have recently entered service; the remainder will be brought into use as they become available. Air suspension is expected to give additional smoothness of riding and it has the incidental advantage of maintaining the rear platform at a constant height above the road surface, irrespective of loading. The air suspension is confined to the rear wheels, independent coil spring suspension being retained for the front.

As our readers will be aware, the RM is a chassisless vehicle, with its mechanical units mounted in front and rear subframes, which are easily detachable for maintenance purposes and are interchangeable between buses. Four different types of air suspension equipment are being given trials, the units being in each case mounted on the rear subframes. The locating holes and fixtures on the subframes and bus bodies are identical both for coil springs and for each type of air suspension so that any rear subframe can be fitted with any of the coil-spring or air-suspension systems. The coil-spring equipment is fitted with internal telescopic shock absorbers. In the case of air suspension equipment separate arm-type shock absorbers are used, the settings being varied according to the make of the equipment.

Dunlop and Firestone Units

Firestone Airide rolling diaphragm equipment is fitted to 25 of the vehicles and the other 25 have Dunlop equipment. Of the 25 fitted with Firestone suspension, 20 have equipment of Firestone Type 1 and five of Type 2. This equipment, which is the maker's standard (with slight modification), has two surge tanks each of approximately 600 cu. in. capacity fixed to the underside of the bus body, and a pedestal base fitted to the rear subframe on each side. Each cylindrical surge tank is connected by a rubber diaphragm to the corresponding pedestal. The unit is filled with air under pressure, holding the tank portion away from the pedestal, the gap being filled by the flexible rubber diaphragm which accommodates the relative vertical movement between the body and the frame. The total movement allowed is 7 in. (3½ in. up and 3½ in. down) from the normal position of equilibrium. The two types of Firestone equipment differ only in the shape of the pedestal, the first having a natural frequency of 80 c.p.s. and the second type a frequency of 70 c.p.s.

The Dunlop equipment, also practically the maker's standard, is of two distinct types, Pneuride triple-convolution, fitted to 20 buses, and Dillow combined convolution and rolling diaphragm, fitted to five buses. The Dunlop triple-convolution type has a large-capacity surge tank (approximately 1,200 cu. in.) and the rubber diaphragm is constrained by two parallel rings to form a triple bellows or concertina shape. The vertical movement allowed is again 7 in., but in this case it is divided into 4½ in. above and 2½ in. below the equilibrium position. The natural frequency of this equipment is approximately 80 c.p.s. The Dillow Dunlop equipment has a smaller surge tank and the rubber diaphragm is constrained into a double convolution. There is also a specially shaped metal ring on the lower convolution rolls. The natural frequency of the Dillow equipment is also approximately 80 c.p.s.

Ancillary Equipment

The ancillary equipment, comprising an air storage reservoir, a charge valve, and two levelling control valves—one each for nearside and offside air springs—is common to all the air suspension units. The air supply is taken from the normal compressor through an existing reservoir (for the air-operated gearbox) to the charge valve and to the storage reservoir for the air suspension. Air in the storage reservoir is at 60 p.s.i. The charge valve acts as a non-return valve to prevent air escaping from the gearbox system in the event of a leak in the air suspension system. Air then passes by way of the levelling control valves to the surge tanks.

A warning light in the driver's cab tells him if pressure in the air suspension system falls below 45 p.s.i. When the bus is unladen pressure in the surge tanks is some 30 p.s.i., rising with loading to 60-70 p.s.i. when the bus is fully laden. A mechanical linkage between body and rear subframe senses the separation of the two and actuates the levelling control valve, which admits air to or exhausts it from the surge tanks until the standard separation is restored, thus giving a constant step height to the rear platform no matter what the passenger load.

To avoid the levelling control valve being brought into almost constant action by road shocks there is a 9-sec. delay in the operation of the valve. The valve is set to act on a minimum change in load of 1½ passengers, equivalent to $\frac{3}{16}$ in. relative movement of body and subframe. When passengers are alighting and loading is reduced, air is exhausted to atmosphere and thus consumed. When passengers are boarding, the pressure in the surge tanks must be increased. This is the purpose of the storage reservoir, which can supply air at times when the vehicle is stationary and the compressor is inactive.

The RM-type buses now fitted or to be fitted with air suspension are as follow:

RM75 and 87 to 105 (20) Firestone Airide Type 1.
RM106 to 110 (5) Firestone Airide Type 2.
RM111 to 130 (20) Dunlop Pneuride.
RM131 to 135 (5) Dunlop Dillow.

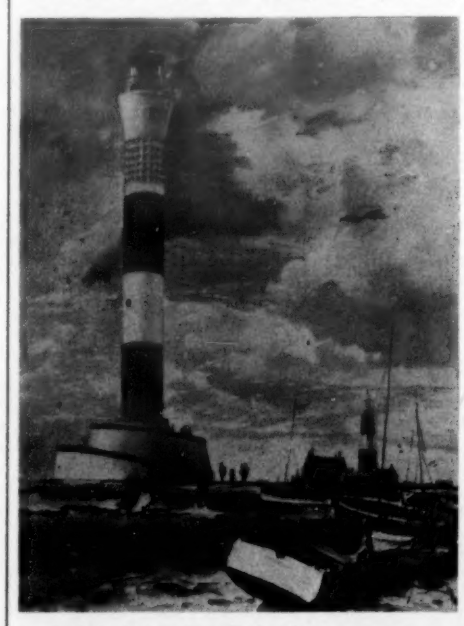
Earlier Experiments

Experiments with air suspension had previously been carried out with one of the prototype buses, RM2, and with the prototype Green Line coach, CRL4. A pre-production bus, RM8, which is being used for experimental purposes, was fitted with air suspension when shown at the Commercial Vehicle Exhibition in 1958.

Channel Lighthouse

NEW TECHNIQUES FOR DUNGENESS STRUCTURE

THE first major Trinity House lighthouse to be erected for over 50 years is to be built on the shingle headland at Dungeness, Kent. To be erected by Taylor Woodrow Construction, Limited, Southall, the new lighthouse will be the first of its kind in the country, fully automatic and embodying new technical and structural ideas, the result of months of investigation by Trinity House staff in co-operation with Messrs. Ronald Ward and Partners. Construction started early in November and it is hoped to complete the work in three to six months.



Artist's impression of the final appearance of the new lighthouse now under construction at Dungeness

Use of Prestressed Concrete

The tower will rise 130 ft. from a white concrete base formed by a spiral ramp enclosing the machine room, which will contain stand-by generators, fog signal equipment and the electrical controls. Slenderness will be achieved by using prestressed concrete so that, with an overall diameter of 12 ft., the walls are only 6 in. thick. Construction is proceeding in a series of concrete drums 5 ft. high, placed one above the other. High-tensile steel prestressing wires are then to be run through the walls from top to bottom and tensioned with powerful jacks.

The lighthouse will not need painting to preserve its banded appearance, as black and white concrete are being used, with carefully selected aggregates and coloured cements. The top white band is patterned by the holes for the 60 loud-speaker units, forming the fog signal. This signal will be automatically set in action when there is a fog warning by the Trinity House fog detector (manufactured by Stone-Chance, Limited) which will be placed at the level of the public observation platform at the top of the ramp.

The light for the main beam is provided by a lamp of entirely new design, developed for lighthouse purposes by Trinity House engineers in conjunction with the A.E.I. Lamp and Lighting Co., Limited. While being little larger than a domestic light bulb, it gives out over 600,000 candle power, three times that of the existing paraffin light at Dungeness.

Headquarters staff of the Wakefield Castrol Oil Group, numbering 800, who had previously been dispersed in a number of buildings in Grosvenor Street, have moved to new quarters at Castrol House, Marylebone, London, W.1. The move took place over a single weekend. As well as normal office accommodation, the new building has two restaurants, a showroom, a cinema, a small residential suite principally for the use of visitors from overseas and a garage for more than 100 cars in the basement, equipped with service and wash bays.

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MULTI-FUEL ENGINES

Abstracts of Papers at F.V.R.D.E. Symposium

As we recorded briefly in our issue dated November 14, a new range of engines of exceptional efficiency capable of operating on a range of fuels from diesel fuel to high-octane petrol has been developed by a number of British companies under contracts placed by the (now defunct) Ministry of Supply. In addition, modifications have been developed which, applied to diesel engines in normal commercial production, provide similar multi-fuel capability. On this page we start the publication of abstracts of papers by engineers concerned in these developments, which were read at a symposium held at the Fighting Vehicles Research and Development Establishment, Chobham, on November 10, when many of these new engines were also demonstrated. The first paper was given by H. L. Troughton, B.Sc.(Eng.), A.M.I. Mech. E., A.M.I.E.E., Assistant Director—Power Plant—F.V.R.D.E.

THE requirement for the multi-fuel engine for military use has arisen mainly due to logistic considerations. The diesel engine has a vastly improved fuel consumption of the order of 60 per cent (in miles per gallon) compared with the current spark-ignition petrol engine. It can well be understood what such a saving in consumption would mean in terms of transporting and distributing fuel to formations in the field during operations. It should be remembered that the quantity can be up to about one million gallons a day. However, circumstances can arise when there may be difficulties in the supply of the requisite quantities of diesel fuel although petrol or gas-turbine fuel may be available. Thus, the ideal engine is one which is capable of burning any of these fuels with comparable efficiency.

Civilian Aspects

There is a civilian aspect which must be considered regarding world supplies of fuel. There is a growing popularity for the diesel engine because of its economy, with the result that in some countries the demand for diesel fuel is outstripping the available supplies. It must be remembered that out of each barrel of crude oil, only a fixed amount of diesel fuel can be produced. Consequently there is a growing surplus of petrol, and diesel fuel is having to be imported to meet the demand. The introduction of an omniverous engine would help to balance this situation provided a solution can be found to the taxation problem. This is important otherwise the petrol-burning multi-fuel engine would be at an economic disadvantage to the diesel fuel-burning engine.

The British War Office has now formulated a requirement for all engines to operate on any fuel ranging from diesel fuel and aviation gas-turbine fuel to a 50-50 mixture of diesel fuel and 74-octane petrol, 74-octane petrol and 80-octane petrol. It is also desirable that the engine should burn civilian premium-grade petrol. The octane ratings are by the motor method and the 80-octane petrol can contain up to 3.6 ml. per Imp. gal. of tetra-ethyl lead.

Six-Year Investigation

The Fighting Vehicles Research and Development Establishment has been investigating the problem of the multi-fuel engine over the past six years. Before describing this work it is worth examining the different fuel requirements of the spark-ignition and compression-ignition engines in order to determine the basic principle on which a multi-fuel engine should operate. If the spark-ignition engine is to achieve a good fuel consumption it must have a high compression ratio, which dictates a fuel of high octane rating. Also the fuel and air must be mixed correctly during the induction and compression strokes which demands a light volatile spirit. Thus, this engine is very particular as to its fuel and cannot operate satisfactorily on low-octane low-volatility fuels.

In the compression-ignition engine the fuel is injected into the combustion chamber at the end of the compression stroke. Therefore, a high volatility is not required. On the other hand it is essential that the combustion of the fuel shall not be too violent, which causes very high bearing loads and noise. There is a delay period between the arrival of the fuel in the combustion chamber and its auto ignition. The shorter this period is, the less violent is the combustion as the fuel will burn comparatively slowly as it is injected. The better the fuel is in this respect the higher is its cetane number.

Opposed Characteristics

The octane rating of a fuel is a measure of its resistance to spontaneous combustion, which is the cause of detonation in the spark-ignition engine. Thus a high octane rating implies a low cetane value and the combustion characteristics of diesel fuel are opposed to those of petrol. It can be seen that the spark-ignition engine does not possess the ability to burn the fuel suitable for a compression-ignition engine but the latter engine can burn the spark ignition engine's fuel provided methods can be devised to overcome the long delay period of low-cetane spirits.

Rolls-Royce, Limited, has been investigating and developing, on behalf of the Ministry of Supply, various forms of four-stroke compression-ignition combustion systems in an endeavour to obtain satisfactory combustion on the low-cetane fuels. The ante-chamber system was shown to be a difficult one but the open-chamber design could be made to operate satisfactorily with speeds up to 4,000 r.p.m. The paper by Mr. Grylls will give details of this work.

Some three years ago, F.V.R.D.E. started an investigation into the operation of a commercial opposed-piston two-stroke engine on the lighter fuels. It was found that this system possessed ideal multi-fuel qualities and operated equally well on all fuels including premium petrol with the same output power and with very little increase in combustion noise. The particular feature of this system which enables the good results to be obtained is undoubtedly the two-part piston. The crown is made of heat-resisting steel with narrow heat-conducting paths to the skirt, resulting in a very hot combustion space which is formed virtually by the crowns of the two pistons. Many thousands of road miles have been covered with the engine running on petrol, with excellent results. Mr. Coy of the Rootes organisation will be giving more details in his paper.

Engine Policy

It is necessary to explain here the general form of the United Kingdom engine policy. This falls into two categories. One is a range of special high-specific output units of small size and weight suitable for installation in fighting vehicles. These engines do not exist on the commercial market and have to be specially designed. The other category covers a range where size and weight are not of paramount importance and are used in wheeled load-carrying vehicles where low first cost is essential. These engines are inevitably commercial units.

Following the investigational work that had been carried out and the success that had been achieved, F.V.R.D.E. felt, some 18 months ago, that a stage had been reached where a decision could be taken on the design that a range of multi-fuel specialist engines should take. Accordingly a family of opposed-piston two-stroke engines utilising two crankshafts was envisaged covering a power range from 30 to 700 b.h.p. in three basic cylinder dimensions. This range of engines is now becoming a reality. At the same time a programme of work was undertaken to develop commercial four-stroke diesel engines to operate satisfactorily on the required alternative fuels. This programme has shown good results.

At the F.V.R.D.E. demonstration: A Foden eight-wheeler powered by 4.1-litre 150-b.h.p. two-stroke diesel engine modified by the manufacturer to run on diesel oil or petrol

The family of specialist engines are all of similar design. They are mounted vertically and utilise two crankshafts which are connected together by a train of gears at the end of the crankcase. The output is taken from one of the idlers in this train and, by adjusting the design of the gearing, provision can be made for taking the output at the most convenient height, speed and torque. Ports in the liner, at one end controlled by the piston, allow the admission of scavenge air and a similar ring of ports at the other end, again piston controlled, provide an exit for the exhaust gases. The fuel is sprayed between the two pistons at inner dead centre. Scavenge air is supplied by a Roots-type blower.

Basic Range

The L Series is the largest and is initially being developed as a six-cylinder although, as with all three series, alternative numbers of cylinders are eventually envisaged. The L60 (six-cylinder) will develop 700 b.h.p. at a crankshaft speed of 2,400 r.p.m. and an output shaft speed of 2,670 r.p.m. Mr. Tattersall will describe this unit in his paper. The medium range is the K Series producing 40 b.h.p. per cylinder at a crankshaft speed of 2,400 r.p.m. and with an output shaft speed of 3,750 r.p.m. This particular shaft speed has been selected as the engine is intended as a direct replacement for the existing B Series spark-ignition petrol engines. A five-cylinder unit, the K50, is being developed first producing 200 b.h.p. Mr. Grylls will explain details of this unit in his paper. The smallest in the family is the H Series, primarily intended as a generating set engine and as such developed as a three-cylinder unit at a very low rating for long life. The H30 in this role produces 30 b.h.p., although there is no reason why this engine cannot be very considerably uprated for an automotive role. Mr. Smith will describe this unit in his paper.

Apart from their excellent multi-fuel potentialities, the form of these engines has certain definite advantages. The size and weight for a compression-ignition engine are remarkable, the L60 has a specific weight of 4.2 lb. per b.h.p. even when in cast-iron form. The K50 is no bigger than the eight-cylinder B-series petrol engine although producing a higher power. In addition, this type of engine has one of the lowest heat rejection figures to coolant of any other form, resulting in smaller radiators and less cooling air, thereby saving space and engine power to drive fans. Further, the exhaust temperature is very low indeed, 400 deg. C. compared with about 1,000 deg. C. for the spark-ignition engine. The engines are

(*Continued on page* 18)

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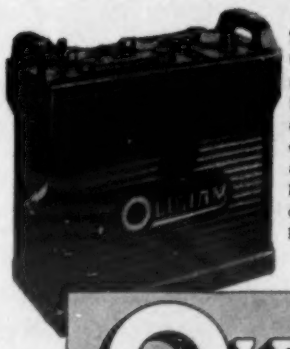

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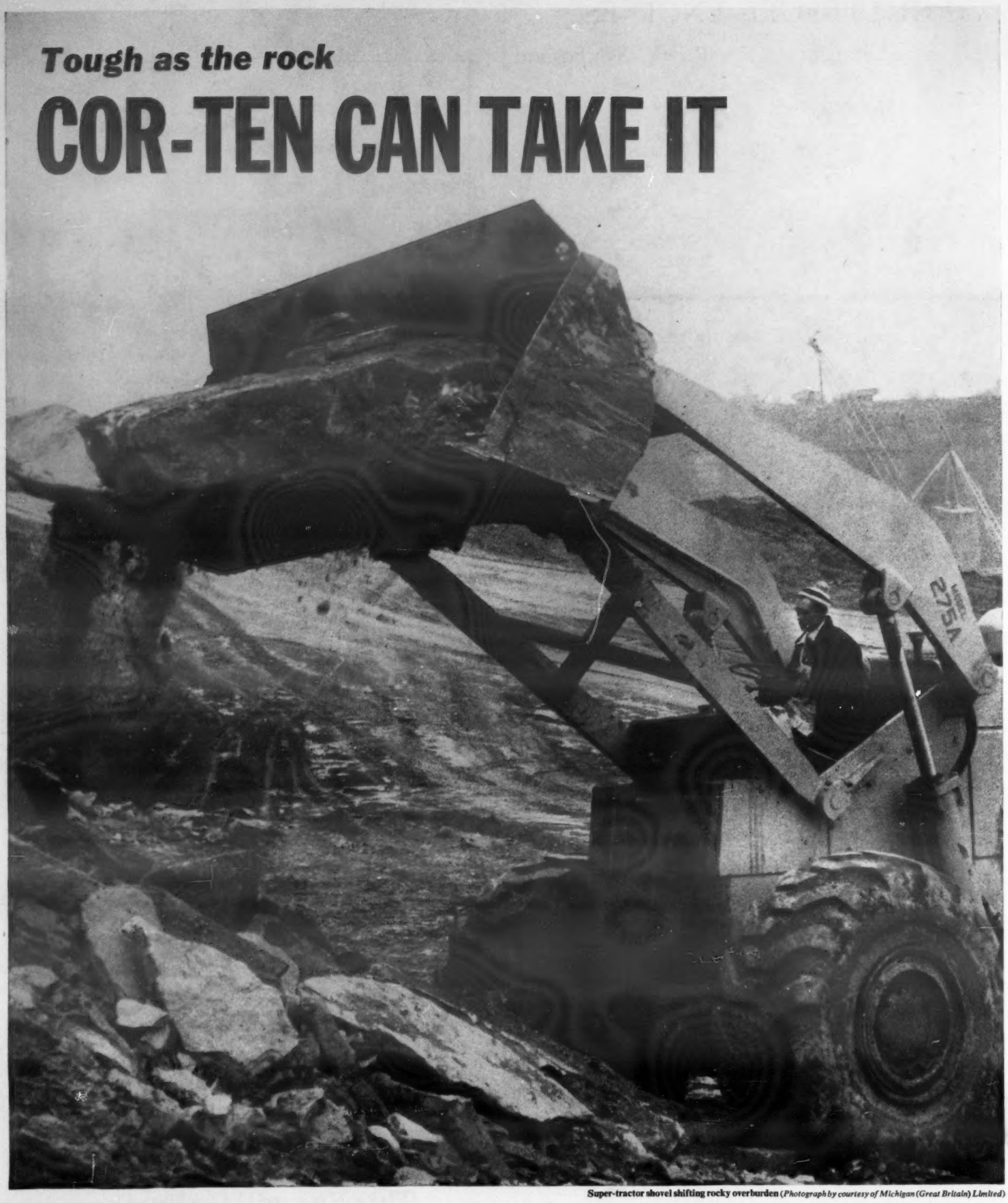

Super-tractor shovel shifting rocky overburden (*Photograph by courtesy of Michigan (Great Britain) Limited*)

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LETTERS TO THE EDITOR

Future for the Railway Passenger

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name and full address of the writer as indication of good faith.

SIR,—Mr. Fiennes' lecture to the Railway Students Association, as reported in your issue of November 28, makes very refreshing reading. The travelling public are tiring of being told that they are not interested in speed if they can have punctuality and reliability. To many regular travellers, at present suffering frequent delays and timetable upheavals in the name of modernisation, it is abundantly clear that the aim of the plan is not high enough. What if, by 1965 or thereabouts, we are presented with a standard of service which but for the war we might have expected by 1945? Do we then embark upon another modernisation plan?

Twenty-three years ago we could do London—Newcastle twice daily in each direction in four hours or just under (67 m.p.h.). Yet after nearly a quarter of a century of further development of transport equipment, and vast capital expenditure, Mr. Fiennes seems almost alone among railwaymen in believing that "Newcastle at 66 m.p.h. will not do." It is pointless to argue that these were isolated cases of "show" trains—even were it the aim to raise the general standard of principal services to the best 1939 levels that would not do either. We are not living in 1939, and the competition the railways have to face has intensified enormously; in any case these are just the trains to lure the busy man away from the car and the aeroplane and they are more than ever required now; not the same trains but something *25 years in advance* of the L.N.E.R. *Silver Jubilee*.

As for 2,000-h.p. diesels for express work, one gathers from their very spasmodic appearances on their forecasted rosters on Mr. Fiennes' own line that that their ability to work consistently even on existing schedules is not proved; it is well that the policy of using such machines on the exacting duties of the future, where competence and reliability must be beyond question, has already been "reappraised."

The man in the street knows little of what is planned until it is presented to him in the timetable (and incidentally how painfully inadequate are the measures generally taken to bring it to his notice). If it does not strike him as an attractive proposition he shrugs his shoulders and sets off by car. Unlike the British Transport Commission, he can afford to be complacent; he has alternatives. It is indeed disturbing to find that the realisation of these facts is not percolating.—Yours faithfully,

J. E. SHELBOURN.

18 *Villa Road,*
Luton, Beds.

Future for Railway Passengers

SIR,—The paper delivered by Mr. Fiennes to the Railway Students Association at the London School of Economics on "Future Developments in Passenger Travel" (MODERN TRANSPORT, November 28) was indeed a breath of fresh air blowing through the pages of dusty conventional timetables. Unfortunately I was not able to join issue with him at the time on one or two points of interest, particularly as he was critical of the slowness of the Southern Region's multiple-unit electric services to Margate, Brighton and Portsmouth, which average, according to Mr. Fiennes, around 50-55 m.p.h. To be competitive with future motorways bult to take traffic at 55 m.p.h. and the private car, Mr. Fiennes advocates stepping these speeds up to 75 m.p.h. Coupled with this he also advocates welded track without joints to increase the smoothness of riding, sealed windows concomitant with air conditioning to reduce noise.

Let me say straight away I am all for faster, smoother riding trains with noise reduced to a minimum in order to deliver our customers to their destinations rested and refreshed by their journey in the shortest possible time, but are Mr. Fiennes' policies the right ones? Surely it is our business as railwaymen to give the service they want, but do they want these things?

Regular Headways Attract

To quote Mr. Fiennes, "No one owes us a living. We have to earn it or go out of business." On the Southern Region we earn it, and increase our business, let me add, by running our trains at about 55 m.p.h. It is not so much the speed that we sell which attracts our passengers, but frequency of train departures on an hourly cycle, which makes for convenience, in trains having a high acceleration reducing journey time between stops. People do not mind whether they travel at 55 or 75 m.p.h. as long as there is a frequent train service with reasonable arrival times after departure. Timetables become unnecessary when passengers know times are at the hour every hour for Brighton, at 10 min. to the hour every hour for Portsmouth, and 20 min. to the hour every hour for Margate. It is the frequency and regularity of departure which people want, also of course the right fare.

This brings me to a further point, viz. cost. Higher speeds, welded track and air conditioned coaches all add to the cost of operation without in themselves inducing traffic. The margin of revenue earned will therefore be less. Take one item of cost: the power to pull the train. Mr. Fiennes wishes to discard his 2,400-h.p. diesel-electric locomotives, as he says the power should be at least that of the Deltics. It could be more, as the Americans, whom Mr. Fiennes mentioned, have found it necessary to couple motive power units together until the pulling part of the train is nearly as long as the Southern eight-car multiple-unit train! All this power concentrated on the front of the train is not in its proper place. Power can best be used by distributing it throughout the train as we do in our southern mutliple-units, which in the end results in less actual h.p. being needed. There are other advantages in this arrangement. Power may be proportioned to load. In off-peak periods the Southern Region breaks down its trains into two- and four-car units. Revenue is still being earned with a cost proportional to the traffic offering.

Once again by an adjustment in price at the off-peak periods we can induce more people to take advantage of our frequent services. As we say on the Southern, "Keep them moving, keep them earning." Not for us the dismal succession of closed stations to be passed at 75 m.p.h. Our stations are open to book passengers on trains which call at regular intervals every hour. By local newspaper advertisements, handbills and posters plus the ever-open station we make our services known and keep our patrons rail travel minded.

Results of Kent Coast Electrification

The passengers' verdict on our efforts is reflected in these facts. In the first two months of electrification of the Kent Coast lines, 1,249,000 people travelled on ordinary tickets to stations between Gillingham and Ramsgate and Dover Priory—35 per cent more than the figure of 932,000 for the same two months last year. At Canterbury East alone the figure rose 42 per cent from 54,000 to 77,000 and at Margate 28 per cent from 192,000 to 245,000. The figures do not include season-ticket holders. Again season-ticket receipts were up by 23 per cent.

These percentage increases in passengers carried have been achieved by greater frequency in electric services over steam resulting in electric trains on the Kent Coast lines to Ramsgate and Dover covering 73,000 miles every week, 60 per cent more than the distance covered by steam trains before electrification in June. It would be a breach of confidence for me to translate these figures into pounds sterling of revenue earned, but I can assure Mr. Fiennes the figures quoted are a true reflection of what really matters, i.e. the revenue earned.

I doubt whether competition in the form of 55 m.p.h. motorways to be built in the future will affect the situation very much. Where will all the cars find parking space when they arrive? In any case we have the plant, machinery and the men to cope with this type of competition if and when it arises, but to get back to the Americans Mr. Fiennes mentioned. Remember, they have become so bogged down with high-powered diesel locomotives, air-conditioned rolling stock, dome cars, and other complicated gadgets that they can no longer compete in the passenger market; the result you know.—Yours faithfully,

H. F. ANDREWS.

61 *Braundton Avenue,*
Sidcup, Kent.

[There seems to be no incompatibility between operating 75-m.p.h. trains and retaining regular-interval departures; how does our correspondent know for certain that that is not what passengers want? Higher speeds and greater passenger comfort may well produce more traffic; at least they will assist in retaining it.—Editor, MODERN TRANSPORT.]

The Rural Bus Problem

SIR,—I am sorry to find myself disagreeing with my old friend and colleague, Mr. E. N. Osborne, regarding his letter in MODERN TRANSPORT of November 28, especially as I have much sympathy with his objective. Attempts to license the contract carriage have been made both before and since the war, wthout proving to be workable or successful. Healthy competition must be based upon the reasonable possibility of new entry into the industry by operators whose costs, while they are small, must always be lower than those of established operators, who have other advantages on their side. I do, however, find myself in full agreement with Mr. Osborne's contention that official contracts should be for a longer term.—Yours faithfully,

J. A. B. HIBBS, M.Sc.(Econ.).

Wetenhall Cottage,
Brooklands Avenue,
Cambridge.

Tramcar and trailer approaching Holstentor Gate in Lübeck shortly before replacement of the system by buses; Transit Bus with articulated two-wheel trailer by Lübeck Station; below, Orenstein and Koppel double-deck bus at Travemünde on Lübeck service; right, next train indicator on Travemünde Station building

The SCAMMELL
12-TON SEMI-TRAILER

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This latest addition to the range of Scammell automatic coupling semi-trailers for use with 4-wheeled tractors incorporates the many tried and well proved features of the earlier models, and a new design undercarriage is fitted to cater for 12-ton loads. All types are available, straight and drop frame with flat, sided or box van bodies. Tankers, hoppers or any special type designed and built to your own specification—and all at the very low cost which only Scammell's quantity production can make possible.

or FIFTH WHEEL

To meet the requirements of operators using other than Scammell's automatic gear, this 12-ton semi-trailer is available with SAE/SMMT 2" dia. king pin and vertical screw, light alloy landing gear for fifth wheel operation. Air pressure or vacuum braking as required.
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Scammells also supply specially designed maximum capacity 8 wheelers and heavy duty semi-trailers for payloads of 15-tons upwards.

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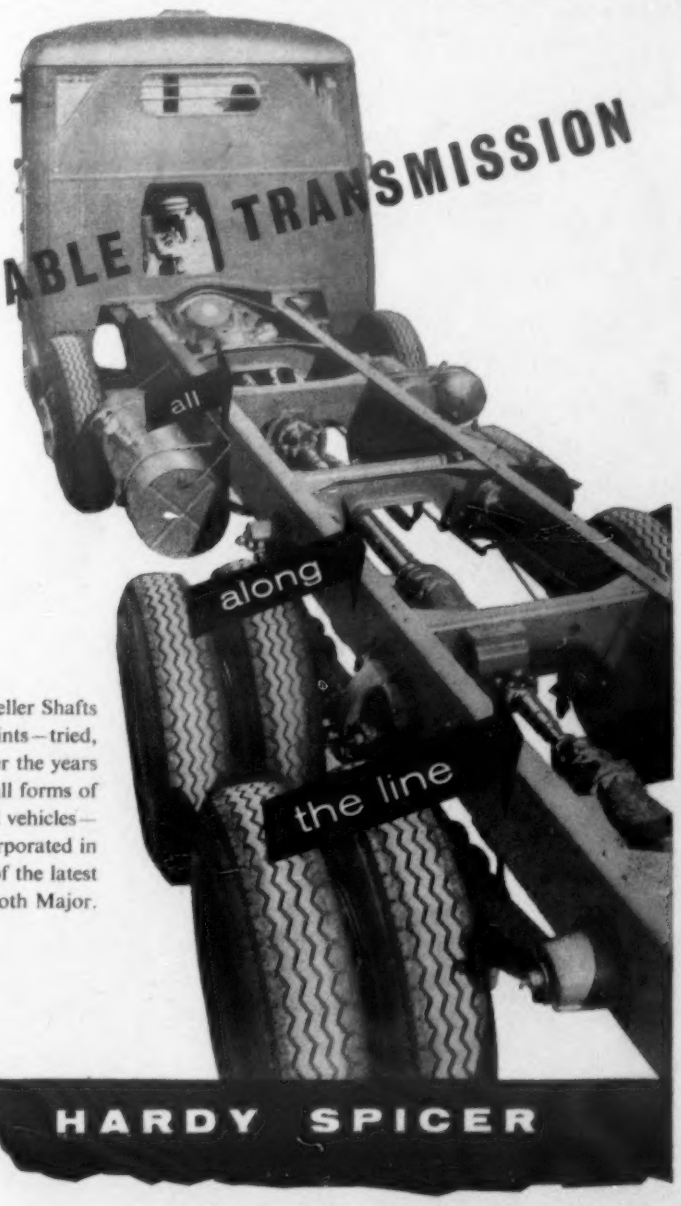

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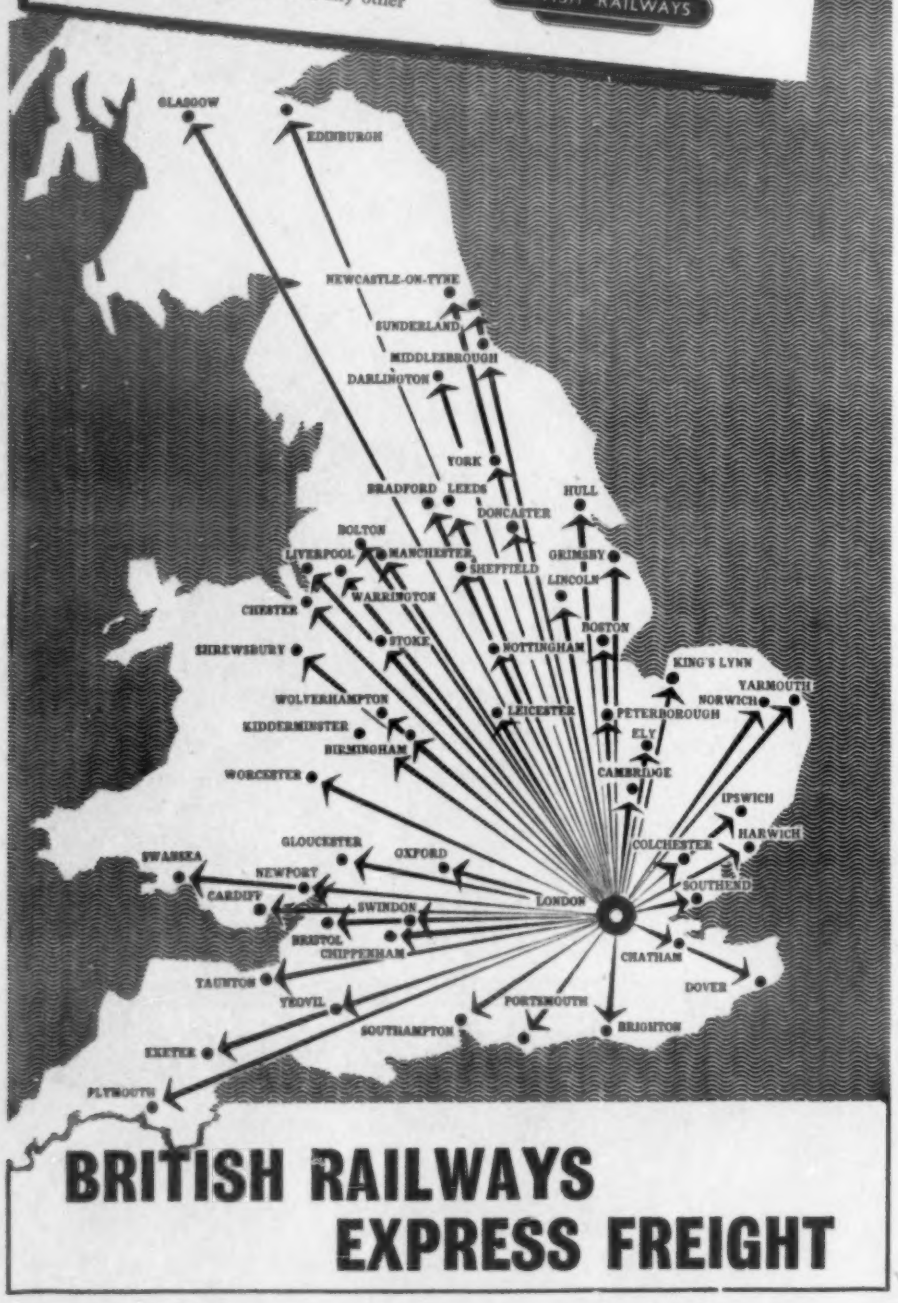
This map shows some of the many towns to which British Railways Express Freight Services can give next-day delivery for wagon-load traffic. It is a time-table service—and door-to-door transport can be provided. Express Freight charges are competitive with any other form of transport. For further information get in touch with your local Station-master or Goods Agent. He'll supply you with all the details you need.

BRITISH RAILWAYS



BRITISH RAILWAYS
EXPRESS FREIGHT

Multi-Fuel Engines

(Continued from page 15)

inherently in balance and have even firing. Bearing loads are reasonable and big ends can be full width, which is not necessarily the case in the V type of engine with side-by-side big ends. There are few moving parts and the absence of all valve gear and camshaft drives is important as well as the cylinder head joint, which can be troublesome at high cylinder pressures. From an installational aspect the form of construction is an advantage and leaves ample space for auxiliaries and the free flow of cooling air.

As is usual in any engineering problem, there are disadvantages as well as advantages. These remarkable features are obtained by reason of the excess air passed through the cylinders during the scavenge period. This entails larger than usual air cleaners and a larger than usual exhaust system. However, these items can be accommodated without much difficulty. All these engines are conservatively rated and have definite development potential.

Equipment common to both specialist and commercial compression-ignition engines is the fuel-standard engines by the Ministry of Supply we, as manufacturers, have done considerable work on the range of fuels likely to be used on military vehicles. These are gas oil, Avtag (JP4), MT74 and MT 80.

The first indication of its performance on this range of fuels is shown by the four curves in the accompanying drawing. These, taken on the engine installed in a demonstration vehicle, represent an attempt with a three-position rack stop and fixed timing to get similar performance on the four fuels. Gas oil and Avtag, each with its own rack adjustment, are virtually equal, but the use of one rack setting for MT74 and MT80 brings in a compromise. It will be seen that under these conditions there is a tendency for the specific fuel consumption to improve with the lower gravity fuels at the low speeds and for this tendency to be reversed slightly at high speeds.

The curves show performance around current standard rating but these do not represent the ultimate and much testing has been done at higher ratings. A quite practical level of performance on

TABLE GIVING LEADING PARTICULARS OF F.V.R.D.E. RANGE OF OPPOSED-PISTON TWO-STROKE DIESEL ENGINES FOR FIGHTING VEHICLES

Particulars	*L60*	*K40*	*K50*	*K60*	*H30*
No. of Cylinders	6	4	6	6	2
Bore in.	4.625	3.4375	3.4375	3.4375	2.166
Stroke in.	5.75×2	3.6×2	3.6×2	3.6×2	2.75×2
Swept Volume	19 litres (1,159 cu. in.)	4.38 litres (267.28 cu. in.)	5.475 litres (334.1 cu. in.)	6.57 litres (400.92 cu. in.)	0.9945 litres (61 cu. in.)
Crankshaft r.p.m.	2,400	2,400	2,400	2,400	3,000
Output Shaft r.p.m. ..	2,670	3,750	3,750	3,750	3,000 or 4,000
Power rated	700 b.h.p. at 2,400 r.p.m.	160 b.h.p.	200 b.h.p.	240 b.h.p.	30 b.h.p.
B.M.E.P. lb./sq. in. ..	96	95	95	95	65
Max. Torque lb./ft. ..	1,600 at 1,500 r.p.m.	400 at 1,750 r.p.m.	500 at 1,750 r.p.m.	600 at 1,750 r.p.m.	63 at 1,700 r.p.m.
Length in.	50.5	31.375	36.5	41.625	30
Width in.	34.0	27	27	27	20.5
Height in.	44.75	30	30	30	28.5
Nett dry weight/lb. ..	3,100	1,120	1,350	1,570	450

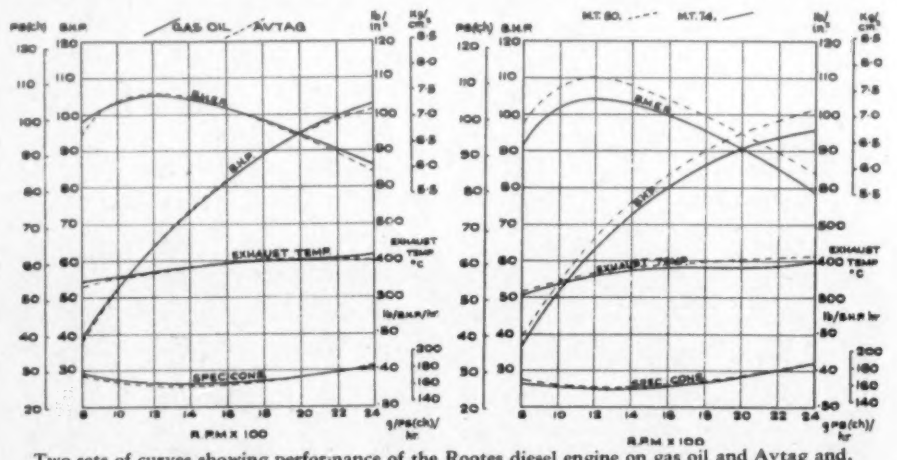
injection equipment and its associated fuel supply system. When this equipment has to operate on petrol, two problems arise, the lack of lubricating properties of petrol and its effect on mechanical parts and also the vapour locking difficulties due to the high vapour pressure of the fuel. These problems have received their share of investigation and have been solved; Mr. Nicolls will describe the results in his paper.

OPPOSED-PISTON DEVELOPMENT

By E. W. Coy, B.A., M.I.Mech.E., Chief Engineer, Diesel Engineering Division, Rootes Group

It has been known for many years that the compression-ignition engine is not unduly selective in its fuel requirements but recently the need for the high-speed versions to operate on a wide range of fuels, including petrol, has been stressed, particularly for military purposes. Much has already been written on this subject in a general manner and this paper therefore confines itself to the operation of opposed-piston two-stroke engines on fuels ranging from gas oil to high-octane petrols.

As the use of the opposed-piston engine is still somewhat restricted, it is of interest to go briefly into its history. The opposed-piston construction was first evolved in the 1870s and examples are Wittig and Linford of 1878-9. In the form in which we now know it, however, the type first made its appearance in 1892 as the Oechelhauser-Junkers gas engine. Development of the type as a compression-ignition unit did not make much headway until during and immediately after the 1914-18 war, when Doxford in Sunderland started to build large marine oil engines which have been successful for 40 years. In Germany, Junkers, after some misfortune with the heavier engines, introduced in the early thirties a light-weight high-speed engine known as the Jumo. Others have followed suit but it would be fair to



Two sets of curves showing performance of the Rootes diesel engine on gas oil and Avtag and, right, MT80 and MT74 petrol. It has since been developed to give substantially higher outputs

say that, up to the 1939-45 war Doxford and Junkers were the two chief exponents of the opposed-piston engine, with Sulzer coming third. A common feature of both Doxford and Junkers was their high performance and good fuel consumption.

Although all modern opposed-piston engines have the one common feature of two opposed-pistons in the cylinder, one controlling air ports and the other exhaust ports, the method of connecting the pistons to the output or crankshaft falls into three categories: (*a*) Single crankshaft with side rods connecting the upper piston to the crank—primarily for heavy slow-speed engines. A variation on this is the Fullagar construction using diagonal tie rods from the upper piston of one cylinder to the lower piston of the adjacent cylinder, thus simplifying the crankshaft; (*b*) two-crankshaft type, the two shafts being geared together; and (*c*) rocker-beam type, where pistons are connected to a single crankshaft by piston rods, rocker levers and connecting rods. This type is usually built in the small sizes where its box-like construction has advantages.

The Rootes diesel engine with which the author has been concerned since its inception, is type (*c*) and was designed primarily for use on the forward-control Commer truck. This engine has been in production for five years and many thousands are in use. The ability of this engine to perform well on a fairly wide range of fuels has already been made known (see Troughton's paper to Diesel Engine Users Association, January, 1959). Apart from extensive testing done on light fuels on both gas oil and MT80 gives 120 b.h.p., or 40 h.p. per cylinder, at 2,400 r.p.m. with an exhaust temperature not exceeding 500 deg. C. To achieve this performance certain changes from standard conditions are necessary, including an increase in the fuel injection rate by about 20 per cent. As a further indication of the capabilities of an opposed-piston engine in regard to power output, in a short duration performance a b.m.e.p. of 117 p.s.i., or 47 h.p. per cylinder, on both MT80 and gas oil has been achieved.

Having dealt with the performance which can be obtained from the opposed-piston engine on light fuels it would be of interest to consider factors which assist the design in obtaining good combustion of these fuels. These are listed in what is, in our view, their order of merit. 1. The air charge movement is under good control due to the swirl induced by the air ports. Additionally, on the Rootes engine the form of combustion chamber employed concentrates the air movement into a diameter smaller than the cylinder diameter when the pistons approach inner dead centre. An incidental advantage is that the temperature rise through the scavenge blower provides some additional heat. 2. The heat loss is at a minimum as the combustion chamber is formed almost entirely between the two pistons. Also, as is common practice on most of the smaller opposed-piston engines, the piston crowns are partially insulated and the metal temperature in the combustion chamber, at maximum h.p., runs between 520 and 600 deg. C., dependent on the rating. 3. The dead volume in the combustion chamber is relatively less than on an engine having one piston per cylinder.

Fuel Feed And Injection

The treatment which the injection equipment requires to make it operate satisfactorily on the light fuels and which includes provision for engine oil lubrication and for venting, is now accepted as conventional for multi-fuel work. It is not, therefore, proposed to go into details except in regard to provisions for preventing vapour lock. A fuel-feed system incorporating a tank-mounted electric pump and a high-pressure mechanically operated lift pump, has been used on the Rootes diesel engine. With volatile fuels having a vapour pressure of 10-12 p.s.i., hot starting is satisfactory at atmospheric temperatures at around 80 deg. F. if the electric pump, which develops a maximum pressure of 5 p.s.i., is allowed to pump fuel through the system and through the permanent vent on the injection-pump gallery for some 30 sec. prior to cranking. This period of pumping is adequate to clear any accumulated vapour from the system. When running under heavy load on this same fuel, again at around 80 deg. F. ambient, a lift-pump pressure of 12 p.s.i. is only just adequate to ensure delivery of vapour-free fuel to the engine, which emphasises the necessity for good venting and adequate feed pressure if consistent performance is to be obtained.

Apart from the foregoing, the fuel-injection equipment for the particular engine under discussion is simple, as there are only three elements for an engine giving over 100 h.p. and three single-hole nozzles. Whilst good performance has been obtained with the injection equipment characteristics determined primarily for gas oil, we consider that more work is necessary to get optimum results, bearing in mind the variation in physical characteristics over the range of fuels under discussion.

(To be continued)

SOCIAL AND PERSONAL

A B.E.T. Appointment

SIR GILMOUR JENKINS, K.C.B., K.B.E., M.C., M.Inst.T., has joined the board of directors of the East Kent Road Car Co., Limited, a B.E.T.-associated company. Sir Gilmour was for many years Permanent Secretary of the Ministry of Transport until he retired earlier this year. He was president of the Institute of Transport in 1954-55.

* * *

The Electric Railway Society is in process of forming a North Western area.

* * *

Alitalia announces the appointment of Mr. Lydio Minatti as station manager at London Airport.

* * *

Mr. H. L. Ellis, A.C.A., at present secretary of the Western and Southern National Omnibus companies, has been appointed general manager of these companies with effect from January 1, 1960. Mr. Ellis started his service in the transport industry in 1932 as secretarial assistant to Thomas Tilling, Limited. In 1932-33 he was appointed secretary of

Mr. H. L. Ellis

H. M. S. Catherwood, Limited, Belfast, a bus operating company which was one of Tilling's subsidiaries, and in 1934 he was transferred to the Eastern National Omnibus Co., Limited, at Chelmsford, as secretary and accountant. In 1942 he was made secretary and chief accountant of the Western and Southern National companies.

* * *

Mr. H. Heap has been elected president of the Manchester and District Traffic Association. Mr. N. Potts has been elected chairman.

* * *

Mr. G. D. Ramsay has succeeded the late Mr. J. M. Harper as traffic manager of the Western S.M.T. Co., Limited.

* * *

The Rover Co., Limited, announces that Mr. W. Martin-Hurst is to join the company as executive director (production).

* * *

Mr. W. Dendy, assistant to district operating superintendent, Newcastle, has been appointed to the post of assistant district passenger superintendent, Newcastle, North Eastern Region, B.R.

* * *

We regret to announce the death last Wednesday of Mr. J. Toulmin, a member of the sales staff of Leyland Motors, Limited, since 1932. He retired last September at the age of 65.

* * *

Mr. C. M. Merrick, managing director, has become chairman and managing director of Petrofina (Gt. Britain), Limited, and Mr. E. Roberts has been elected a director.

* * *

Mr. G. G. Hilditch, since 1958 deputy general manager and engineer, Plymouth City Transport, has been appointed general manager and engineer, Great Yarmouth Corporation Transport Department.

* * *

As already reported, Mr. W. R. G. A. Haynes has been appointed district operating superintendent, Euston, London Midland Region, B.R. He entered the railway service as a junior clerk at Woodford in 1921 and after gaining operating experience at various places was promoted to the position of controller at Kings Cross in 1940. Subsequently he held similar positions at Nottingham and Manchester and returned to London in 1942 where he was attached to the superintendent's office, Marylebone. The following year Mr. Haynes was appointed chief trains clerk and chief controller, Doncaster, and later held similar posts at Gerrards Cross and Liverpool Street. Since 1951 Mr. Haynes has been successively assistant district operating superintendent at Derby, Gloucester and Manchester. In 1957 he was appointed freight assistant to the line traffic manager, Liverpool Street.

Mr. W. R. G. A. Haynes

* * *

The Mayor of Dewsbury (Councillor T. Evers), a former bus conductor with the Yorkshire Woollen District Transport Co., Limited, returned to the firm recently to present more than 100 safe conducting and driving awards for 1958. Mr. Raymond Birch, the chairman of the company, said "the Y.W.D. company has a safety record as good as any and better than most." In 1958 the company ran more than 10 million miles, and there were only 107 accidents for which their own staff could be held blameworthy or one accident in every 99,300 miles.

* * *

M. Abraham, of the Direction des Routes in Paris, spoke at the Institution of Civil Engineers on Tuesday this week at the discussion of the paper, "The Economic Returns from Road Works." This was presented by Dr. George Charlesworth (senior principal scientific officer, Road Research Laboratory) and Mr. J. L. Paisley (senior engineer, Ministry of Transport). Salient points in the paper are: Guidance on how to assess the relative priorities of proposed works; the need to set up standards of road layout and traffic control; assessment of the merit of radial motorways in the suburbs of London and of parking garages in towns.

The Western Region announces the appointment of Mr. J. E. W. Morecroft as audit accountant.

* * *

Mr. G. Wright, assistant to district goods superintendent (sales), Leeds, has been appointed goods agent, Halifax, North Eastern Region, B.R.

* * *

Mr. J. K. Blue, passenger commercial assistant, line traffic manager's office, South Eastern division, Southern Region, B.R., has been made passenger assistant, Waterloo, vice Mr. J. D. Atkins, retiring.

* * *

Mr. R. P. M. Wormal, assistant divisional shipping manager, Dover, has been appointed divisional shipping manager, Dover, Southern Region, B.R., vice Mr. A. J. Hemens, retiring.

* * *

Lieutenant-Commander Douglas F. Battison, R.N. (Retd.), was recently appointed sales manager of Electropol Processing, Limited, Farnham, Surrey, pioneer of the world-patented Electropol method of electro-polishing stainless steel.

* * *

Mr. John G. Bridges, O.B.E., director-general of the British Travel and Holidays Association since 1945, has been elected president of the International Union of Official Travel Organisations at its annual conference and general assembly in Manila, Philippines.

* * *

Mr. F. J. Zmarzly, Bradford works manager since 1957, has been appointed works manager of the International Harvester Co. of Great Britain, Limited, at Doncaster, and Mr. S. L. Sonander, assistant works manager at Bradford and formerly at Doncaster, will succeed him at Bradford.

* * *

Mr. J. S. Matthews, chairman and joint managing director of R. Cripps and Co., Limited, Nottingham, a Henly subsidiary, has accepted an invitation to join the board of Henlys, Limited. He succeeds Mr. H. L. Buckley, who retires after having been a director since 1928.

* * *

The Southern Railway Dramatic Society presented an excellent production of Vernon Sylvaine's *As Long as They're Happy* at the Scala Theatre, London, on December 1. It delighted the audience, among whom was the president of the Society, Mr. Charles Hopkins.

* * *

Mr. W. M. Dravers has been appointed chairman of the Devon General Omnibus and Touring Co., Limited, and, in consequence, has resigned the managing directorship. As chairman Mr. Dravers succeeds Mr. W. T. James. The latter has resigned from the board and is replaced by Lord Buckhurst.

* * *

Mr. C. A. Lawrence, general sales manager, Taskers of Andover (1932), Limited, is retiring this month for health reasons after 27 years with the company. He served his engineering apprenticeship with Stothert and Pitt, Limited, and was subsequently with the Dominion Bridge Company in Canada.

* * *

Following the acquisition of Folland Aircraft, Limited, by the Hawker Siddeley Group, the board of directors of the company has been reconstituted. Sir Roy Dobson has been made chairman and Mr. J. T. Lidbury managing director. Messrs C. L. Hill, W. E. W. Petter, E. C. Lysaght, and C. E. Blunt have resigned from the board.

* * *

A.E.C. (Sales), Limited, announces that Mr. John Cooke has been appointed director—export upon the retirement of Mr. J. M. E. Fell. Previous to joining A.E.C. (Sales), Limited, he was for several years with Crossley Motors, Limited, and during the last few years in his capacity as export manager has travelled extensively throughout export markets.

* * *

In addition to the premier award, value £550, prizes of £25, £15 and £10 will be given by the British Industrial Truck Association for ideas concerning the use of industrial trucks. The major award will once again be a grant to enable the selected candidate to attend the seventh annual material handling training course at Lake Placid, U.S.A., in June next year.

* * *

Mr. G. W. Anson, M.B.E., A.M.Inst.T., district operating superintendent, Glasgow South, Scottish Region, B.R., retired recently. He entered the service of the former North Eastern Railway at Hull in 1912 and after clerical experience at Hull Docks and service with H.M. Forces in Egypt, France and Belgium, worked in train and traffic control offices as traffic agent, goods agent and yardmaster, and acting assistant district superintendent, Newcastle. In 1946 he became stationmaster, York, and in 1949 assistant district operating superintendent, Hull. Mr. Anson was appointed assistant to operating superintendent, Scottish Region, in 1950. From February, 1954, he occupied temporarily the position of district operating superintendent, Glasgow, and on the reorganisation of districts was appointed district operating superintendent, Glasgow South, in February, 1955.

Mr. G. W. Anson

* * *

Mr. P. Murdoch, divisional shipping manager and harbourmaster, Newhaven, has been appointed docks manager, Middlesbrough and Hartlepools, in succession to Mr. T. S. Roberts, who, as already announced, has been appointed chief docks manager, Hull Docks, B.T.C.

* * *

The following divisional executive appointments were recently made in the traction division of Associated Electrical Industries, which operates from Trafford Park, Manchester: General manager, Mr. F. Whyman; commercial manager, Mr. W. B. G. Collis; manufacturing manager, Mr. R. P. Knight; chief engineer, Mr. G. R. Higgs; and divisional executive (Rugby), Mr. J. H. Cansdale.

* * *

With a view to improving co-ordination and ensuring continuity of policy and direction of the affairs of the company and of its subsidiary companies for as far ahead as possible, and also to fill the vacancies on the board recently created by the untimely death of Mr. L. K. Everitt and the retirement of Mr. H. D. Boyd, Edgar Allen and Co., Limited, has appointed Mr. F. A. Ross, Mr. W. G. A. Jenkins and Mr. J. Higginbotham directors of the company.

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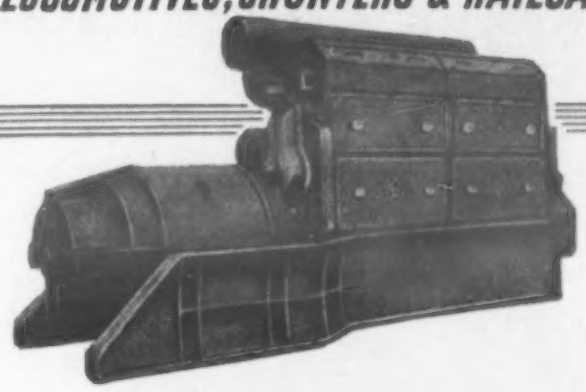

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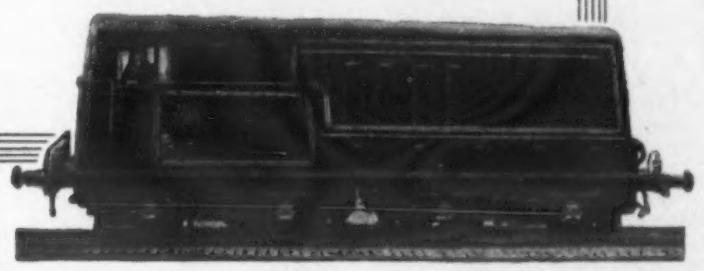

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IMPORTANT CONTRACTS

British Vehicles for Turkey

ANNOUNCING two shipments of lorries and buses to Turkey, the Leyland group has just revealed for the first time its receipt of over £300,000 worth of vehicle orders from Turkey since the market there was recently reopened to vehicle imports. Before the market was closed for lack of sterling, Turkey was responsible for a large part of Leyland's export business. The shipments consist of 85 Leyland and Albion goods chassis and 15 underfloor-engined Leyland buses. Other vehicles under the contracts will be shipped later. Five of the buses, which will all be operated by Eskischir Municipality, are Tiger Cubs with 40-seat Metropolitan-Cammell-Weymann bodies. The remaining 10 buses, Leyland Worldmasters, have 60-seat M.C.W. bodies.

Ansett-A.N.A. Orders Third Electra

Ansett-A.N.A., the first airline to introduce the Lockheed Electra turboprop transport in Australasia, has increased its order from two to three. Delivery of the third Electra is scheduled in 1960.

South Wales Docks Contracts

The British Transport Commission (South Wales Docks) has placed the following contracts:

W. T. Henley's Telegraph Works Co., Limited, for supply of cable for King's Dock Lock pumping station, Swansea Docks.

Penarth Pontoon, Shipway and Shiprepairing Co., Limited, for repairs to steam dredger *Peeress*.

Alsthom Locomotives in S. Africa

An agreement has been signed between Alpheus Williams and Dowse, the South African maker of railway rolling stock, and Alsthom, the French manufacturer of electric and diesel-electric locomotives, covering the granting of technical aid for the manufacture of these locomotives in the Union.

Charging Sets Exported

Auto Diesels, Limited, Uxbridge, has received an order from the Burmese Ministry of Defence for 500 petrol-engined battery-charging sets. A repeat order from the Crown Agents brings the total number of Auto Diesels charging sets being supplied to the Nigerian military forces to 117.

British Lathes Exported

The Colchester Lathe Co., Limited, one of the 600 Group of companies, has over the last two months taken export orders to a total value of over £300,000. The machines are to go to 38 different countries. For some years, over half the output from the Colchester factory, which is claimed to be the only plant in the free world devoted exclusively to centre lathe production, has been exported.

Mobile Ice-cream Factories

An order for 100 mobile ice-cream plants has been placed with M.T.S., Limited, by Mylos (Caterers). The vehicles, based on Commer 1½-ton chassis, will be the first in this country to have installed "instant" ice-cream making equipment made by the Italian Carpigiani concern. In the interests of hygiene, Warerite wallboard specially manufactured for the purpose will panel a large proportion of the interiors. An order for 250 similar vehicles for service in Italy is contemplated.

North Eastern Region Contracts

The North Eastern Region of British Railways has placed the following contracts:

Wakefield Dick Oils, Limited, London, W.1, for provision of oiling equipment at Bradford Manningham motive power depot.

International Furnace Equipment Co., Limited, Peterborough, for four gas-fired furnaces at Darlington locomotive works.

Finlay Engineering, Limited, Newport, Mon., for a rail-bending machine and two rollers for Crofton permanent way depot.

The Reliance Telephone Company, London, W.C.2, for a telephone exchange at Newcastle Central Station.

Heenan and Froude, Limited, Worcester, for dynamometer equipment for Darlington locomotive works.

Broom and Wade, Limited, High Wycombe, for air compressors and ancillary equipment at Crofton permanent way depot.

Ransomes, Sims and Jefferies, Limited, Ipswich, for a 1-ton battery-operated mobile crane for use at Leeds Wellington Street goods station.

J. W. Roberts, Limited, Bolton, for the application of Limpet asbestos for the construction of Enfield—Chingford electric stock at York carriage works.

Felco Hoists, Limited, London, S.W.7, for electric pulley blocks and cables for use in the points and crossings shop at Park Lane, Newcastle.

Worthington-Simpson, Limited, Leeds, 6, for an air compressor and ancillary equipment for Pelaw new power-operated signalbox.

Siemens and General Electric Railway Signalling Co., Limited, Wembley, for the extension of control and point operation at Huddersfield signalbox.

Cross-Channel Electricity Link

The Central Electricity Generating Board has awarded a £220,000 contract to Richard Costain, Limited, for civil engineering work on the station at Lydd, Kent, forming the British termination of the cross-Channel cable link connecting the electricity systems of the C.E.G.B. and Electricité de France. Civil construction of the station began in October and is due for completion in 13 months. The cross-Channel scheme, which has the largest capacity of any similar scheme in the world, was introduced in order to save generating capacity both in Great Britain and in France, a saving possible because peak-load periods of the two countries do not coincide. The estimated total saving on generating plant is around £8 million and the annual saving in operating cost is estimated at £300,000, of which Great Britain would take £200,000. The total cost of the installation is estimated at about £4,500,000.

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TENDERS INVITED

THE following items are extracted from the Board of Trade Special Register Service of Information. Inquiries should be addressed, quoting reference number where given, to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London, W.C.1.

December 9—Union of South Africa.—Natal Roads Department for one 95-b.h.p. diesel crawler-mounted FRONT-END EXCAVATOR and one 120-b.h.p. diesel 1½-cu. yd. SHOVEL. Tenders to the Chairman, Natal Provincial Tender Board, P.O. Box 358, Pietermaritzburg. (ESB/27551 and 27554/59.)

December 10—Formosa.—Central Trust of China for five sets of parts for 30-ton PETROL TANK WAGONS, including couplers, four-wheel bogies and air brakes. Tenders to the Central Trust of China, Purchasing Department, 68 Yen Ping Nan Lu, Taipei, Taiwan. (ESB/27807/59.)

December 17—Chile.—Ministry of Public Works for ROAD-MAKING EQUIPMENT, including asphalt plant, finishers, diesel road rollers and sampling drill sets. Photocopies of tender documents (in Spanish) from Export Services Branch, B.o.T., price 6s. (ESB/28079/59.)

December 18 and 21—French West Africa.—Miferma, for 14 diesel-electric main-line and six diesel-electric shunting LOCOMOTIVES and 494 various large-capacity WAGONS. Tender documents from Société Anonyme des Mines de Fer de Mauritanie, 11 Boulevard Lannes, Paris 16. (ESB/27184/59.)

December 22—Korea.—International Co-operation Administration for eight petrol-engined four-wheel-drive UTILITY VEHICLES. Photocopies of tender documents from Export Services Branch, B.o.T., price 9s. (ESB/27838/59/ICA.)

December 24—Sudan.—Sudan Railways for 35 COACH UNDERFRAMES 60 ft. long. Specification and drawings from the Office of Controller of Stores, Atbara, price £S3.5. (ESB/24632/59.)

SHIPPING and SHIPBUILDING

Newhaven Modernisation

PROSPECTS for Newhaven Harbour have brightened immensely with the news that the Southern Region of British Railways plans to spend £500,000 in 10 years to extend and improve harbour facilities. The old wooden dock at North Quay is to be replaced by a modern one of concrete; a new 300-ft. berth and two new cranes are planned for Railway Quay; and at East Quay, two sheds are to be modernised and a new heavy crane provided. Negotiations are proceeding for the development of vacant land in the harbour area, and a number of new industries are expected to take up sites. Newhaven's greatest asset is that the harbour can be used at any time and in any weather.

Chatham and the Continent

CHATHAM agent Arthur Gamman, Limited, is attempting to open a regular shipping line between Chatham and France shortly. With the joint introduction by Arthur Gamman and a Dutch shipping company in Rotterdam of a regular shipping line from Chatham to Rotterdam recently a link was forged between the Medway port and the Continent. General cargoes of apples, chemicals, cement, hops, etc., are carried to the two ports twice a week. On Mondays and Thursdays ships arrive from Rotterdam and they leave Chatham on Tuesdays and Fridays on the return journey.

Shipping and the I.o.T.

RESPONDING to the toast "The Institute of Transport" which had been proposed by Mr. R. T. Crake, chairman of the Merseyside and District section of the Institute, Mr. R. G. Grout, president, said it had been remarked that the Institute had not been so interested in shipping as in the other forms of transport. That was not so. It was not the Institute that had neglected shipping, but shipping which had neglected the Institute, except in the Merseyside area, where of the 474 members, 74 were connected with shipping and port activities. The section was fortunate in having as its chairman an ex-master mariner.

Superliner Company Formed

IT is announced that Mr. L. E. Detwiler and Verolme United Shipyards, Rotterdam, have now founded American European Lines, Limited, an American-European transport company, established at The Hague. The company's aim is transport of passengers and cargo by sea, land and air, and exploitation of ships and other means of transport. The board consists of Professor Gerbrandy (wartime Netherlands Prime Minister in London), chairman, and Mr. Detwiler and Mr. C. Verolme. According to the statutes the majority of the board members have to be Netherlands citizens and residing in the Netherlands. Previously, Mr. Detwiler had announced that the new company would be a holding company and that it was intended to build four big ocean liners which would carry passengers at very moderate fares.

U.S. Union for Convenience Flags

TWO American seamen's unions have formed an International Maritime Workers Union to provide collective bargaining for crews sailing flags of convenience vessels. The announcement was made by Mr. Joseph Curran, president of the National Maritime Union, and Mr. Paul Hall, president of the Seafarers International Union. The two union leaders were named co-chairmen of the new labour organisation. The union presidents estimated that 70,000 seamen were working on 1,695 ships operating under Liberian, Panamanian and Honduran registry.

The union leaders said the New International Maritime Workers Union aimed at organising "all seamen employed aboard vessels whose flags are foreign to the United States, and whose ultimate ownership or control has no substantial connection with the country of registry, in order to assure those seamen just and fair treatment to improve and protect their wages, the hours of labour and their working conditions." They are attending a meeting of the fair practices committee of the International Transport Workers' Federation in Antwerp.

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FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Barton Transport

Barton Transport, Limited, shows a net profit for the year ended September 26, 1959, of £80,154 (£86,765) before tax, £27,840. It will be recalled that the company recently re-entered the road haulage sphere by acquiring an existing business.

Duple Motor Bodies

A final dividend of 6 per cent (8 per cent on smaller capital) is announced by Duple Motor Bodies, Limited, for year ended June 30, 1959, making 9 per cent (8 per cent) for the year. Group profits were £214,990 (£181,127) and net profits £113,320 (£91,152) after tax.

S. Smith and Sons (England)

An extract from the chairman's report on S. Smith and Sons (England), Limited, for the year 1958-59: "The present level of activity [in the motor industry], brought about by a combination of the manufacturers' outstandingly successful exports and an increasingly buoyant home trade, is overtaxing our capacity and obliging us to resort to costly measures of improvisation in order to discharge our responsibility to the industry. The question we have to determine is whether this high level of activity is exceptional or whether, on the contrary, the industry is moving towards even greater production. Our view is that the motor industry will see even higher peaks of activity than at present. Although, therefore, I spoke only last year about the completion of a three-year expansion programme, we are now once again obliged to undertake further expansion of our manufacturing capacity for automobile products, with the knowledge, nevertheless, that there may well be periods when that increased capacity will not be fully used." Net profit after tax was £1,931,000 (£1,631,000) and dividend 17½ (12½) per cent.

Metropolitan-Cammell in South Africa

The directors of Union Carriage and Wagon Co. (Pty.), Limited, Nigel, Transvaal, South Africa, and Metropolitan-Cammell Carriage and Wagon Co., Limited, Birmingham, announce that an agreement has been signed whereby these companies will collaborate in the supply of railway rolling stock for the South African Railways. This announcement is made following the acquisition by Metropolitan-Cammell of a substantial shareholding in Union Carriage including that previously held by Leyland Motors, Limited. Union Carriage was registered in 1937 and is a subsidiary of Commonwealth Engineering Co., Limited, the well-known firm of rolling stock builders of Sydney, Australia, which retains a majority shareholding. The Budd Company of Philadelphia, manufacturer of stainless-steel passenger cars, is also a major shareholder. The effect of this agreement will be to make it possible for Union Carriage to utilise the unrivalled knowledge and experience of Metropolitan-Cammell in the South African market in the design and building of high-quality passenger rolling stock, which, coupled with the resources already available from Australia and U.S.A. in the techniques of steel car construction, will materially assist the local company in serving the South African Railways and Harbours.

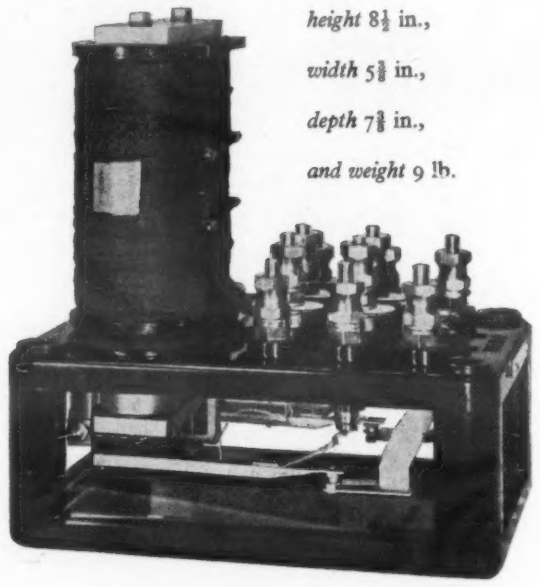
TYER & CO. LTD.

ESTABLISHED 1851

TRACTIVE ARMATURE
DIRECT CURRENT
BLOCK RELAY

TYER'S FOUR ARM TYPE G2/B

conforming, generally, to the British Standard's Specification No. 1659 of 1950, with all material and workmanship of the highest quality



height 8½ in.,
width 5⅜ in.,
depth 7⅜ in.,
and weight 9 lb.

coil windings: to suit all requirements

contacts { front, 50% silver, 50% graphite
arm, fine silver
back, fine silver

casework: moulded two-piece unit with four rectangular glass sides with the whole unit so cased to ensure the contact chamber being proof against moisture.

terminals: O.B.A., nut type to B.S.S. 422 or, if required, to A.R.A. standards. Shrouds for terminals catered for as also short stems to suit detachable coupling units.

packing: cartons designed to contain the unit for supply and storing.

Illustrating the Block Relay, type G2/B with one 4.5 ohm (pick-up) coil and one 500 ohm (hold-off) coil. The unit being provided with two front and two back contacts, in connection with interlocking the starting signal and the single line token block instrument.

Similar four arm units as Track Type relays G2/T and Line type relays G2/L conforming, in all respects, to B.S.S. No. 1659 of 1950.

TYERS G2/T, G2/L, G2/B type tractive armature (four arm) relays are inexpensive both as regards initial cost, maintainance & freedom from fault.

another TYER *product*

Designed and built by specialists with the first name in signalling, at their Merrow Siding Works, Guildford, Surrey. "Standardisation of parts—interchangeability—unit construction" are part of the Company's design policy.

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